United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with the
Illinois Agricultural
Experiment Station

Soil Survey of Calhoun County, Illinois

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How To Use This Soil Survey

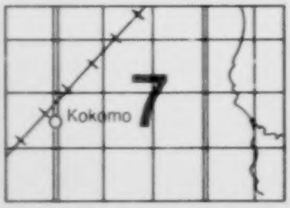
General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

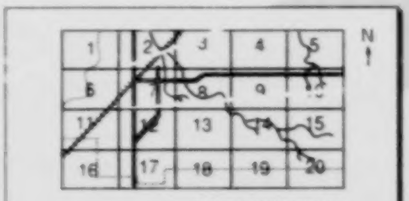
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.



MAP SHEET

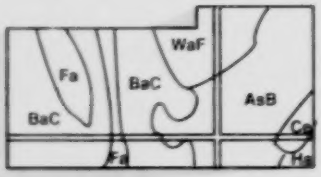
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



INDEX TO MAP SHEETS

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.

MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1984. Soil names and descriptions were approved in January 1986. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1984. This survey was made cooperatively by the Soil Conservation Service and the Illinois Agricultural Experiment Station. It is part of the technical assistance furnished to the Calhoun County Soil and Water Conservation District. The cost of the survey was shared by the Calhoun County Board and the Illinois Department of Agriculture.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

This soil survey is Illinois Agricultural Experiment Station Soil Report 130. It supersedes the soil survey of Calhoun County published in 1932.

Cover: Calhoun County is a leading producer of fruit in Illinois. This orchard is in an area of Fayette silt loam, 10 to 18 percent slopes, eroded.

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Foreword

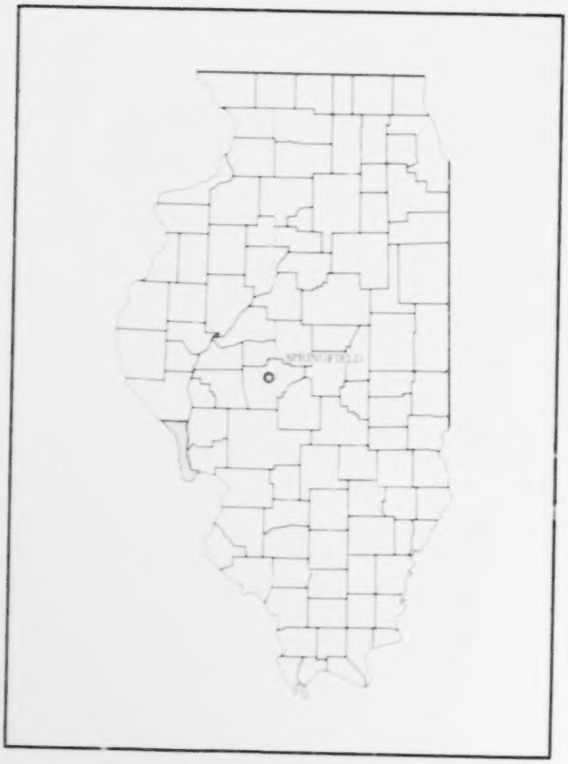
This soil survey contains information that can be used in land-planning programs in Calhoun County, Illinois. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

John J. Eckes
State Conservationist
Soil Conservation Service



Location of Calhoun County in Illinois.

Soil Survey of
Calhoun County, Illinois

By Michael E. Lilly, Soil Conservation Service

Fieldwork by Michael E. Lilly and James A. Ritterbusch, Soil Conservation Service, and Timothy J. O'Connor, Merlin A. Wydeven Van Deraa, and Richard J. Zipprich, Calhoun County

United States Department of Agriculture, Soil Conservation Service,
in cooperation with the
Illinois Agricultural Experiment Station

Calhoun County is in the west-central part of Illinois. It has a total area of 179,840 acres, or 281 square miles. In 1980 the population was 5,914 *(4)*. Hardin, the county seat, had a population of 1,130.

The county is bordered on the north by Pike County, on the east by the Illinois River, and on the west and south by the Mississippi River. In the uplands, the soils are gently sloping to very steep, and mainly formed in windblown silt, called loess. On bottom lands adjacent to rivers the soils are nearly level, and formed in alluvium.

Elevations in the county range from about 810 feet above sea level on the upland-dividing ridge to about 420 feet above sea level at the confluence of the Illinois and Mississippi Rivers.

Agriculture is the main industry in the survey area. The major cultivated crops are soybeans, corn, and winter wheat. Apple and peach orchards are also important, and cover about 1,300 acres. Approximately 30 percent of the county is wooded.

This survey updates the first soil survey of Calhoun County published in 1932 *(7)*. It provides additional information and contains larger maps that show the soils in greater detail.

General Nature of the County

This section provides general information about the climate and the history and development of Calhoun County.

Climate

Prepared by the Illinois State Water Survey, Champaign, Illinois

Calhoun County is cold in winter and hot and humid in summer. Rains are generally well distributed throughout the year. Snow falls during the winter and adds to the accumulation of soil moisture by spring. Normal annual precipitation is adequate for all crops that are suited to the temperature and length of the growing season in the area.

Tornadoes and severe thunderstorms strike occasionally. They are usually of local extent and of short duration, and damage is normally isolated. Hailstorms sometimes occur during the warmer periods.

Table 1 gives data on temperature and precipitation for the survey area as recorded at White Hall and at Jerseyville in the period 1951 to 1980. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 31 degrees F, and the average monthly minimum temperature is 21 degrees. The lowest temperature on record, which occurred at Jerseyville in January 1977, is -25 degrees. In summer the average temperature is 75 degrees, and the average monthly maximum temperature is 87 degrees. The highest recorded temperature, which occurred at Jerseyville in July 1954, is 112 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 35.49 inches. Of this, 21.9 inches, or 62 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 16.53 inches. The heaviest 1-day rainfall during the period of record was 5.81 inches, at Jerseyville on August 11, 1961.

The average seasonal snowfall is 21 inches. The greatest snow depth at any one time during the period of record was 18 inches. On the average, 28 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

History and Development

The original inhabitants of Calhoun County date back as far as about 10,000 years. Much of the lower Illinois River Valley region is rich in archaeological history. Many Indian burial mounds are throughout the county, both in the higher regions and on the lower river terraces. Numerous archaeological studies are being conducted in the county.

The Indians in the county during early European settlement likely belonged to the Peoria Tribe. Possibly never more than 500 of them inhabited the county at any given period of time. Historians also speculate that the county was used mainly as a hunting ground for tribes from adjacent areas.

The first Europeans to explore the area now known as Calhoun County were most likely the French. The first European settler there arrived in 1801.

After the War of 1812, much of the land located between the Illinois and Mississippi Rivers was promised to veterans of that war. As part of the "Military Lands," Calhoun County was surveyed in 1817. On January 10, 1825, the Illinois Legislature established and created the present boundaries of Calhoun County. It was named after John C. Calhoun, U.S. Vice President, 1825-32. Gilead was named the county seat. The county seat was moved to Hamburg for a short time period and in 1847 was moved to its present location in Hardin, formerly known as Child's Landing.

The location of Calhoun County between the Mississippi River to the west and the Illinois River to the east meant that the county was very dependent on river travel. Steamboats were essential to the county's economy from the early 1830's until the completion in 1931 of the Joe Page Bridge over the Illinois River at Hardin. The double-leaf lift bridge has the longest lift span in the world. The only bridge in the county, it provides year-round access to the county. Calhoun County is the only county in Illinois that does not have rail service.

During the early development of Calhoun County, lumbering was the principal industry. By the latter part of the 19th century, farming was starting to thrive and it replaced lumbering. Along with the principal grain crops, apple and peach orchards were developed and have become a major component of the county's economy. Today, agriculture is the main industry in the county. About 1,100 residents are engaged directly in some form of agriculture.

The principal crops in the area are corn, 21,000 acres; soybeans, 17,000 acres; wheat, 6,500 acres; and apple and peach orchards, 1,300 acres.

Livestock production in the county is important to the economy. The hog population in the county is more than 51,000. Cattle number more than 11,500 head. About 20,000 acres is used for pasture.

Each year the county produces more than 9 million pounds of apples and 2.3 million pounds of peaches.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biologic activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area.

Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, soil reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows the soil associations in this survey area. Each association has a distinctive pattern of soils, relief, and drainage. Each is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The general soil map of Calhoun County joins a published general soil map of Pike County. In some areas the soil names do not agree across the county line because the same soils were not identified in both counties. The soils and the parent material in these areas are similar, and the soils have similar interpretations for use and management.

Soil Descriptions

1. Seaton-Goss Association

Well drained, gently sloping to very steep, silty soils formed in loess or in loess over material weathered from limestone; on uplands

This association consists mainly of soils on side slopes, ridgetops, and hillsides in the uplands (fig. 1). Drainageways commonly have moderately steep to very steep side slopes. Areas between the drainageways are narrow and gently sloping to strongly sloping. Slopes range from 2 to 70 percent.

This association makes up about 63 percent of the county. It is about 65 percent Seaton soils, 7 percent Goss soils, and 28 percent minor soils.

Seaton soils are gently sloping to very steep, and are on side slopes, hillsides, and ridgetops. Typically, the surface layer is brown and very dark grayish brown, friable silt and silt loam about 4 inches thick. The subsurface layer is yellowish brown, friable silt about 4 inches thick. The subsoil is yellowish brown and dark yellowish brown, friable silt loam about 40 inches thick. The underlying material to a depth of 60 inches or more is yellowish brown, friable silt loam.

Goss soils are moderately steep to very steep, and are on side slopes. Typically, the surface layer is very dark grayish brown, friable cherty silt loam about 2 inches thick. The subsurface layer is brown, friable very cherty and cherty silt loam about 8 inches thick. The subsoil extends to below a depth of 60 inches. The upper part is strong brown, firm cherty silt loam. The middle part is yellowish red, firm very cherty silty clay loam and very cherty silty clay. The lower part is yellowish red, very firm cherty silty clay.

Minor soils in this association are Fayette, Hamburg, Haymond, Sogn, and Wakeland soils. Fayette soils are well drained, gently sloping to strongly sloping, and on ridgetops and side slopes above the major soils. Hamburg soils are very steep, and on convex hillsides on bluffs. Haymond soils are well drained, and Wakeland soils are somewhat poorly drained. Haymond and Wakeland soils are on narrow flood plains below the major soils. Sogn soils are somewhat excessively drained, very steep, shallow to bedrock, and on side slopes.

The major soils in this association are used mainly as woodland or pasture. In some less sloping areas they are used for cultivated crops. These soils are well suited and moderately suited to use as woodland and pasture. Moderately steep to very steep areas are unsuited to cultivated crops because erosion is a severe hazard.

In areas used for corn, soybeans, or small grain, erosion is a hazard. A system of conservation tillage that leaves crop residue on the surface after planting, a

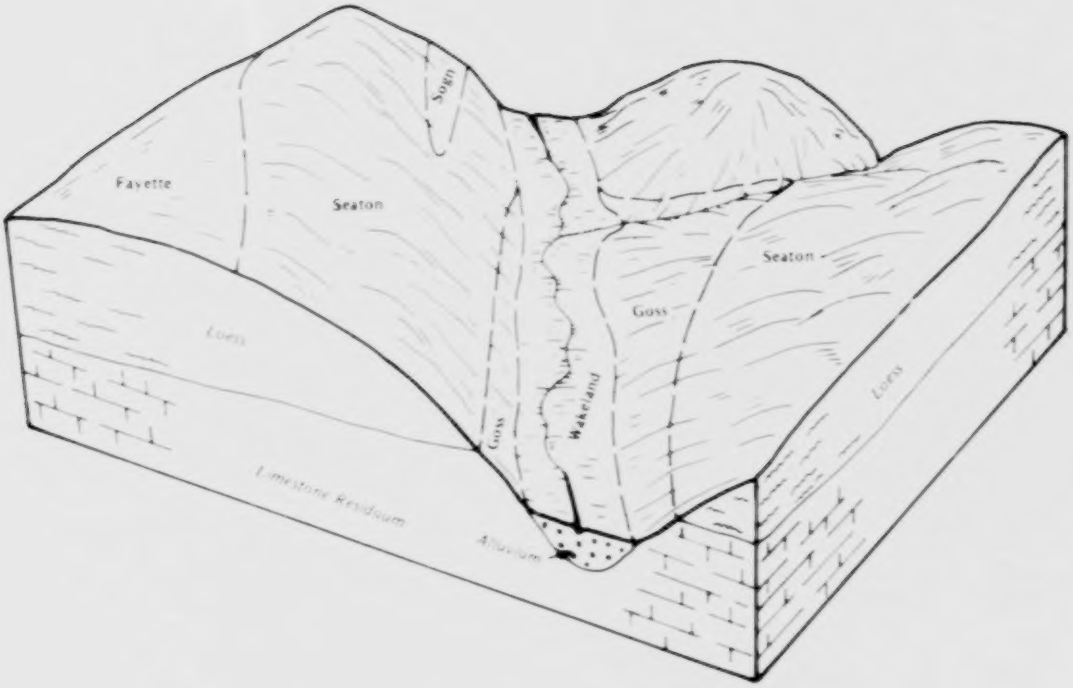


Figure 1.—Typical pattern of soils and parent material in the Seaton-Goss association.

cropping system that includes grasses and legumes, contour farming, and terraces help to control erosion. Orchardgrass, bromegrass, fescue, alfalfa, and alsike clover are suitable grasses and legumes for crop rotations and for pasture planting.

2. Fayette-Sylvan-Rozetta Association

Well drained and moderately well drained, gently sloping to steep, silty soils formed in loess, on uplands

This association consists of soils on side slopes and ridgetops in the uplands (fig. 2). Most drainageways have strongly sloping to steep side slopes. Sinkholes are common in this association. Slopes range from 1 to 30 percent.

This association makes up about 20 percent of the county. It is about 55 percent Fayette soils, 10 percent Sylvan soils, 7 percent Rozetta soils, and 28 percent minor soils.

Fayette soils are gently sloping to strongly sloping, well drained, and on side slopes and ridgetops in higher areas between drainageways. Typically, the surface layer is brown, friable silt loam about 7 inches thick. The subsurface layer is brown, friable silt loam about 7 inches thick. The subsoil is dark yellowish brown and about 34 inches thick. The upper part is friable silt loam. The next part is firm silty clay loam. The lower part is firm silt loam. The underlying material to a depth of 60 inches or more is dark yellowish brown, friable silt loam.

Sylvan soils are strongly sloping to steep, well drained, and on side slopes. Typically, the surface layer is dark grayish brown, friable silt loam about 6 inches thick. The subsoil is about 29 inches thick. The upper part is dark yellowish brown, firm silty clay loam. The lower part is yellowish brown, friable silt loam. The underlying material to a depth of 60 inches or more is yellowish brown, friable, calcareous silt.

Rozetta soils are moderately sloping and strongly sloping, moderately well drained, and on ridgetops and

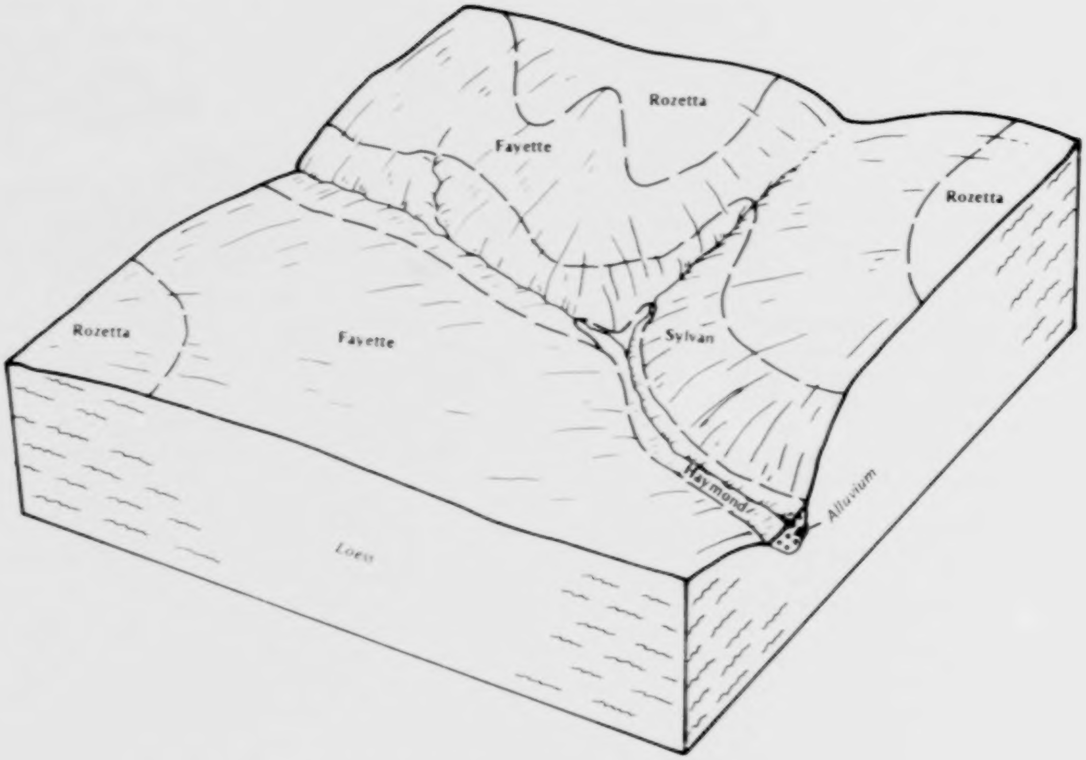


Figure 2.—Typical pattern of soils and parent material in the Fayette-Sylvan-Rozetta association.

side slopes. Typically, the surface layer is brown, friable silt loam or silty clay loam about 7 inches thick. The subsoil is dark yellowish brown and about 38 inches thick. The upper part is friable silty clay loam. The middle part is mottled, firm silty clay loam. The lower part is mottled, firm silt loam. The underlying material to a depth of 60 inches or more is dark yellowish brown, mottled, friable silt loam.

Minor soils in this association are Haymond and Stronghurst soils. Haymond soils are well drained, nearly level, and on flood plains below the major soils. Stronghurst soils are somewhat poorly drained and in nearly level areas generally farther from the drainageway than the major soils.

The major soils in this association are used mainly for pasture or cultivated crops. Some steeper areas are used as woodland. These soils are well suited to use as pasture and woodland. They are moderately suited to cultivated crops.

In areas used for corn, soybeans, or small grain, erosion is a hazard. A system of conservation tillage that leaves crop residue on the surface after planting, a cropping system that includes grasses and legumes, contour farming, and terraces help to control erosion. Orchardgrass, bromegrass, fescue, alfalfa, and alsike clover are suitable grasses and legumes for crop rotations and for pasture planting.

3. Beaucoup-Tice Association

Poorly drained and somewhat poorly drained, nearly level, silty soils formed in alluvium; on flood plains

This association consists mainly of nearly level soils on flood plains. Depressions and former stream channels are widely scattered throughout the bottom land. Slopes range from 0 to 2 percent.

This association makes up about 15 percent of the county. It is about 60 percent Beaucoup soils, 20 percent Tice soils, and 20 percent minor soils.

Beaucoup soils are poorly drained. Typically, the surface layer is very dark gray, firm silty clay loam about 12 inches thick. The subsoil is about 36 inches thick. The upper part is very dark gray, firm silty clay loam. The middle part is dark gray, mottled, firm silty clay loam. The lower part is dark gray, mottled, friable, stratified fine sandy loam, loam, silt loam, and silty clay loam. The underlying material to a depth of 60 inches or more is dark gray, mottled, friable silty clay loam.

Tice soils are somewhat poorly drained. Typically, the surface layer is very dark grayish brown, friable silt loam about 6 inches thick. The subsurface layer is about 11 inches thick. It is very dark grayish brown, friable silt loam and silty clay loam. The subsoil is about 40 inches thick. The upper part is grayish brown, firm silty clay loam. The middle part is brown, mottled, very firm silty clay loam. The lower part is dark grayish brown, mottled, firm silt loam. The underlying material to a depth of 60 inches is grayish brown, mottled, firm silt loam.

Minor soils in this association are Orion, Raddle, and Wakeland soils. These soils have less clay than the major soils. Orion and Wakeland soils are in positions similar to those of the major soils. Raddle soils are well drained and in more sloping areas on out slopes adjacent to bluffs.

The major soils in this association are used mainly as cropland or as habitat for wetland wildlife. They are well suited to use as habitat for wetland wildlife. They are moderately suited to cultivated crops.

In areas used for corn, soybeans, or small grain, the seasonal high water table is a limitation. Installing surface or subsurface drainage systems helps to lower the seasonal high water table. Flooding is a hazard in areas of these soils. It occasionally damages crops, especially winter wheat.

4. Booker-Okaw Association

Very poorly drained and poorly drained, nearly level, clayey and silty soils formed in lacustrine sediments or in loess and lacustrine sediments; on terraces

This association consists mainly of nearly level soils on terraces. Some areas have natural levees. Slopes range from 0 to 2 percent.

This association makes up about 2 percent of the county. It is about 65 percent Booker soils, 25 percent Okaw soils, and 10 percent minor soils.

Booker soils are very poorly drained. Typically, the surface layer is very dark gray, firm clay about 9 inches thick. The subsoil is mottled and extends below a depth of 60 inches. The upper part is very dark gray, firm clay. The middle part is very dark gray, very firm clay. The lower part is dark gray, extremely firm clay.

Okaw soils are poorly drained. Typically, the surface layer is dark gray, friable silty clay loam about 5 inches thick. The subsurface layer is dark gray, friable silty clay loam about 8 inches thick. The subsoil is firm and extends to a depth of 60 inches or more. The upper part is very dark gray silty clay. The middle part is very dark gray, dark gray, and olive gray clay. The lower part is olive gray, olive, dark grayish brown, and light olive brown clay.

Minor soils in this association are Hurst and Oakville soils. Hurst soils are somewhat poorly drained, nearly level, and on terraces. They contain less clay throughout than the major soils. Oakville soils are well drained, nearly level or strongly sloping, and on terrace breaks and dunes. They contain more sand throughout than the major soils.

The major soils in this association are used mainly as cropland or woodland. These soils are moderately suited to cultivated crops and to use as woodland. They are well suited to use as habitat for wetland wildlife. The major limitations are the seasonal high water table and poor tilth.

Broad Land Use Considerations

The soils in Calhoun County vary widely in their suitability for major land uses.

About 25 percent of the county is used for cultivated crops, mainly corn and soybeans. This cropland is scattered throughout the county, but is concentrated largely in associations 2, 3, and 4. Association 2 is in areas on uplands where the main hazard is water erosion. Fayette, Sylvan, and Rozetta soils are dominant. Parts of association 3 are subject to occasional flooding, mainly in early spring. The flooding causes slight to moderate damage to crops. The seasonal high water table is the major limitation. Beaucoup and Tice soils are dominant in association 3. Association 4 is in areas on terraces where the main limitation is the seasonal high water table. Booker and Okaw soils are the main soils in association 4.

About 11 percent of the land in the county is in pasture. The pasture is largely in associations 1 and 2. Fayette, Goss, Rozetta, Seaton, and Sylvan soils are the main soils, and the main hazard is erosion.

About 30 percent of the county is woodland. The woodland is scattered throughout the county, but is largely in association 1. This association is gently sloping to very steep, and erosion is the main hazard. This association consists mainly of Seaton and Goss soils.

The suitability for recreation ranges from good to poor, depending on the intensity of the expected use. Associations 3 and 4 are poorly suited because of flooding and the seasonal high water table. The slope in association 1 limits use of the soils for intensive recreational development, such as playgrounds and camp areas. Associations 1, 3, and 4 are suitable for hiking or horseback riding. Small areas are suitable for intensive recreational development in all associations, even those that generally are poorly suited to this use.

The suitability for wildlife habitat is excellent throughout the county. All associations are well suited to use as habitat for openland wildlife. The suitability for habitat for woodland wildlife is good in association 1. The soils on flood plains in association 3 are well suited to use as habitat for wetland wildlife.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Seaton silt, 30 to 60 percent slopes, is a phase of the Seaton series.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits, quarries, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Soil Descriptions

19D2—Sylvan silt loam, 10 to 15 percent slopes, eroded. This strongly sloping, well drained soil is on upland side slopes and ridgetops. Individual areas are irregular in shape and range from 2 to 45 acres.

Typically, the surface layer is dark grayish brown, friable silt loam. Erosion has thinned the surface layer to a thickness of about 6 inches. The subsoil is about 29 inches thick. The upper part is dark yellowish brown, firm silty clay loam. The lower part is yellowish brown, friable silt loam. The underlying material to a depth of 60 inches or more is yellowish brown, friable, calcareous silt. In some areas the subsoil is thicker and depth to carbonates is more than 40 inches. In other areas the subsoil has less clay.

Water and air move through the Sylvan soil at a moderate rate. Surface runoff is rapid. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is moderate and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is moderately suited to cultivated crops and well suited to pasture and hay.

If this soil is used for cultivated crops, further erosion is a hazard. Crop rotations in which forage crops are grown for 1 year or more, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion and to maintain soil productivity. Returning crop residue to

best copy available

the soil or regularly adding other organic material helps to maintain soil fertility and soil tilth and to increase the rate of water intake.

Establishing pasture plants or hay helps to control erosion. Orchardgrass, bromegrass, tall fescue, and alfalfa are suited to this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Rotation grazing, deferred grazing, and applying fertilizer help to maintain the pasture and to control erosion.

The land capability classification is IIIe.

19D3—Sylvan silty clay loam, 10 to 15 percent slopes, severely eroded. This strongly sloping, well drained soil is on upland side slopes. Over most of the area, erosion has removed most of the original surface layer and tillage has mixed the rest with the upper part of the subsoil. Individual areas are irregular in shape and range from 2 to 25 acres.

Typically, the surface layer is dark yellowish brown, friable silty clay loam about 7 inches thick. The subsoil is about 17 inches thick. The upper part is dark yellowish brown, friable silty clay loam. The lower part is dark yellowish brown, friable silt loam. The underlying material to a depth of 60 inches or more is yellowish brown, friable, calcareous silt loam. In places the carbonates are nearer the surface.

Included with this soil in mapping are small areas of Hamburg soils. These soils are on landscapes similar to those of the Sylvan soil. They are calcareous throughout and have less clay in the subsoil. They make up 5 to 10 percent of the map unit.

Water and air move through the Sylvan soil at a moderate rate. Surface runoff is rapid. Available water capacity is very high. Organic matter content is very low. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is poorly suited to cultivated crops and moderately suited to pasture and hay.

If this soil is used for cultivated crops, further erosion is a hazard (fig. 3). A crop rotation dominated by forage crops, a conservation tillage system that leaves crop residue on the surface after planting, and contour farming help to control erosion and to maintain soil productivity. Returning crop residue to the soil or regularly adding other organic material helps to maintain soil fertility and soil tilth and to increase the rate of water intake.

Establishing pasture plants or hay helps to prevent excessive erosion. Orchardgrass, bromegrass, tall fescue, and alfalfa are suited to this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Rotation grazing, deferred grazing, and applying fertilizer help to maintain the pasture and to control erosion.

The land capability classification is IVe.

19F3—Sylvan silty clay loam, 15 to 30 percent slopes, severely eroded. This steep, well drained soil is on upland side slopes. Over most of the area, erosion has removed most of the original surface layer and tillage has mixed the rest with the upper part of the subsoil. Individual areas are irregular in shape and range from 5 to 30 acres.

Typically, the surface layer is brown and dark yellowish brown, friable silty clay loam about 3 inches thick. The subsoil is about 27 inches thick. The upper part is dark yellowish brown, firm silty clay loam. The lower part is yellowish brown, friable silt loam. The underlying material to a depth of 60 inches or more is yellowish brown and light brownish gray, friable, calcareous silt loam. In some areas the subsoil is thicker and depth to carbonates is more than 40 inches.

Included with this soil in mapping are small areas of the somewhat excessively drained Hamburg and Sogn soils. Hamburg soils are calcareous throughout and are in positions similar to those of the Sylvan soil. Sogn soils are shallow to limestone bedrock and are in positions similar to those of the Sylvan soil. Included soils make up 5 to 10 percent of the map unit.

Water and air move through the Sylvan soil at a moderate rate. Surface runoff is rapid. Available water capacity is very high. Organic matter content is very low. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is generally unsuited to cultivated crops because of the slope and erosion hazard. Areas of this soil should be seeded to pasture or planted to woodland. The soil is moderately suited to use as pasture and woodland.

Establishing pasture plants or hay on this soil helps to control erosion. Orchardgrass, bromegrass, tall fescue, and alfalfa are suited to this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion. A no-till system of pasture seeding helps to control erosion during the establishment period. Rotation grazing, reseeding, deferred grazing, and applying fertilizer help to maintain the pasture and to control erosion.

If this soil is used as woodland, the erosion hazard,

Figure 3.—Further erosion is a hazard in areas of Sylvan silty clay loam, 10 to 15 percent slopes, severely eroded. Haymond soils are in the foreground.

the equipment limitation, and seedling mortality are management concerns. Plant competition also is a management concern. Laying out logging roads and skid trails on the contour helps to control erosion. On the steeper slopes, skidding the logs or trees uphill with a cable and winch also helps to control erosion. Firebreaks should be grass. Bare logging areas should be seeded to grass or to a grass-legume mixture. Use of machinery is limited to periods when the soil is firm enough to support its weight. The seedling mortality rate can be reduced by planting older and larger nursery stock and by eliminating competing vegetation near the seedlings. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

The land capability classification is VIe.

30G—Hamburg silt loam, 30 to 65 percent slopes. This very steep, somewhat excessively drained soil is on convex hillsides. Individual areas are irregular in shape and range from 10 to 100 acres.

Typically, the surface layer is very dark grayish brown, calcareous, friable silt loam about 3 inches thick. The next layer is brown, calcareous, friable silt loam about 6 inches thick. The underlying material is dark yellowish brown, calcareous, friable silt loam in the upper part. The next part is yellowish brown, calcareous, friable silt loam. The lower part to a depth of 60 inches or more is light yellowish brown, calcareous, friable silt loam. In some areas the soil has more clay. In other areas it is not calcareous within a depth of 20 inches.

Included with this soil in mapping are small areas of well drained Goss soils and somewhat excessively drained Sogn soils. Also included are small areas of rock outcrops. Sogn soils are shallow to limestone bedrock and are in positions similar to those of the Hamburg soil. Goss soils have coarse fragments throughout and are in positions similar to those of the Hamburg soil. Included areas make up 5 to 15 percent of the map unit.

Water and air move through the Hamburg soil at a moderate rate. Surface runoff is very rapid. Available water capacity is high. Organic matter content is low. The shrink-swell potential is low, and the potential for frost action is high.

In most areas this soil is used as woodland or pasture. It is moderately suited to use as woodland and pasture. It is well suited to use as habitat for woodland wildlife. It is generally unsuited to cultivated crops and hay because of the slope and severe erosion hazard.

If this soil is used as woodland, the erosion hazard, the equipment limitation, and seedling mortality are management concerns. Laying out logging roads and skid trails on the contour and skidding logs or trees uphill with a cable and winch help to control erosion. Seeding bare logging areas to grass or to a grass-legume mixture also helps to control erosion. Use of machinery is limited to periods when the soil is firm enough to support its weight. The seedling mortality rate can be reduced by eliminating competing vegetation near the seedlings and by selecting larger seedlings for planting. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, surface compaction, and damage to tree roots.

If this soil is used as habitat for wildlife, measures that exclude livestock help to prevent depletion of shrubs and sprouts that provide food and cover for woodland wildlife, such as deer, turkey, squirrels, and a variety of songbirds. Planting hedges and rows of shrubs provides cover for doves and many songbirds.

The land capability classification is VIIe.

70—Beaucoup silty clay loam. This nearly level, poorly drained soil is on flood plains. It is subject to occasional flooding or ponding for brief periods from March to June of most years. Individual areas are irregular in shape and range from 5 to 1,000 acres.

Typically, the surface layer is very dark gray, firm silty clay loam about 12 inches thick. The subsoil is about 36 inches thick. The upper part is very dark gray, firm silty clay loam. The middle part is dark gray, mottled, firm silty clay loam. The lower part is dark gray, mottled, friable, stratified fine sandy loam, loam, silt loam, and silty clay loam. The underlying material to a depth of 60 inches or more is dark gray, mottled, friable silty clay loam that has strata with a higher content of sand.

Included with this soil in mapping are small areas of very poorly drained Booker soils and somewhat poorly drained Wakeland soils. Booker soils have more clay throughout and are in positions similar to those of the Beaucoup soil. Wakeland soils have a lighter colored surface layer, have less clay throughout, and are slightly higher on the flood plain than the Beaucoup soil. Also included are soils in low areas that pond water for longer periods. Included soils make up 5 to 10 percent of the map unit.

Water and air move through the Beaucoup soil at a moderately slow rate. Surface runoff is very slow or ponded. The seasonal high water table is 0.5 foot above the surface to 2 feet below during spring. Available water capacity is high. Organic matter content is high. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to use as habitat for wetland wildlife. It is moderately well suited to cultivated crops and to pasture or hay.

This soil is sufficiently drained for the commonly grown crops. Flooding occasionally damages crops, especially winter wheat. Dikes and levees help protect the soil from flooding. Surface drains help to remove excess surface water. Measures that maintain the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil help to maintain tilth and fertility.

If this soil is used for pasture and hay, a drainage system and flood-control measures are needed. Reed canarygrass and alsike clover are suited to this soil. Overgrazing reduces forage yields and causes surface compaction and poor tilth. Restricted use during wet periods helps to keep the pasture and the soil in good condition.

Areas of this soil provide good habitat for wetland wildlife. Shallow water areas generally are available, and others can easily be created. Also available are grain and seed crops, wild herbaceous plants, wetland plants, and other important habitat elements.

The land capability classification is IIw.

75B—Drury silt, 2 to 5 percent slopes. This gently sloping, well drained soil is on foot slopes and alluvial fans. Individual areas are long and narrow and range from 5 to 30 acres.

Typically, the surface layer is dark brown, friable silt about 5 inches thick. The subsurface layer is brown, friable silt about 12 inches thick. The subsoil is about 24 inches thick. It is dark yellowish brown, friable silt loam. The underlying material to a depth of 60 inches or more is dark yellowish brown, friable silt loam. In some areas the surface layer is darker. In other areas the slope is more than 5 percent. In some places coarse fragments are below a depth of 40 inches.

Included with this soil in mapping are small areas of well drained Haymond and Seaton soils. Haymond soils are in lower positions on flood plains and are subject to flooding. Seaton soils are on side slopes above the Drury soil. Included areas make up 5 to 15 percent of the map unit.

Water and air move through the Drury soil at a moderate rate. Surface runoff is slow. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is low, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops and to pasture and hay.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled, however, by a conservation tillage system that leaves crop residue on the surface after planting, contour farming, terraces, or a conservation cropping system. Returning crop residue to the soil helps to maintain soil tilth and fertility.

Pasture plants and hay grow well on this soil. Orchardgrass, bromegrass, tall fescue, and alfalfa are suited. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Rotation grazing, deferred grazing, reseeding, and applying fertilizer help to maintain the pasture and to control erosion.

The land capability classification is IIe.

75C—Drury silt, 5 to 10 percent slopes. This moderately sloping, well drained soil is on foot slopes and alluvial fans. Individual areas are long and narrow and range from 5 to 30 acres.

Typically, the surface layer is brown, friable silt about 7 inches thick. The subsoil is about 30 inches thick. The upper part is brown, friable silt loam. The lower part is dark yellowish brown, firm silt loam. The underlying material to a depth of 60 inches or more is dark yellowish brown, friable silt loam. In some areas the surface layer is darker. In other areas coarse fragments are below a depth of 40 inches. In some places more clay is in the subsoil.

Included with this soil in mapping are small areas of well drained Goss and Haymond soils. Goss soils have coarse fragments throughout and are on steeper slopes above the Drury soil. Haymond soils are subject to flooding and are on flood plains below the Drury soil. Included soils make up 5 to 10 percent of the map unit.

Water and air move through the Drury soil at a moderate rate. Surface runoff is medium. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is low, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is moderately suited to cultivated crops, pasture, and hay.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, terraces, or a conservation cropping system helps to control erosion. Returning crop residue to the soil helps to maintain soil tilth and fertility.

Pasture plants and hay grow well on this soil. Orchardgrass, bromegrass, tall fescue, and alfalfa are suited. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Rotation grazing, deferred grazing, reseeding, and applying fertilizer help to maintain the pasture and to control erosion.

The land capability classification is IIIe.

84—Okaw silty clay loam. This nearly level, poorly drained soil is on terraces. In most years it is subject to rare flooding, and to ponding for brief periods from March through June. Individual areas are irregular in shape and range from 2 to 400 acres.

Typically, the surface layer is dark gray, friable silty clay loam about 5 inches thick. The subsurface layer is dark gray, friable silty clay loam about 8 inches thick. The subsoil is firm and extends to below a depth of 60 inches. The upper part is very dark gray silty clay. The middle part is very dark gray, dark gray, and olive gray clay. The lower part is olive gray, olive, dark grayish brown, and light olive brown clay. In some places the surface layer is silt loam.

Included with this soil in mapping are small areas of very poorly drained Booker soils. These soils are in similar positions and have a darker surface layer. They make up less than 10 percent of the map unit.

Water and air move through the Okaw soil at a very slow rate. Surface runoff is very slow or ponded. The seasonal high water table is 0.5 foot above the surface to 1 foot below during spring. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential and the potential for frost action are high.

In most areas this soil is used for cultivated crops or woodland. This soil is well suited to use as habitat for wetland wildlife. It is moderately suited to cultivated crops and woodland.

In the areas used for corn, soybeans, or small grain, the seasonal high water table is a limitation. This soil is sufficiently drained for the commonly grown crops. Measures that maintain or improve the drainage system are needed. Surface drains help to prevent excessive wetness. Keeping tillage to a minimum and returning crop residue to the soil help to maintain tilth and fertility.

If this soil is used as woodland, the equipment limitation, seedling mortality, and windthrow are management concerns. They are caused by the seasonal high water table. Plant competition also is a concern because of its affect on desirable seedlings. Use of machinery is limited to periods when the soil is firm enough to support its weight. Planting stock that is older and larger than is typical and planting on ridges help to reduce seedling mortality. Replanting may sometimes be needed. Harvesting methods that do not isolate the remaining trees or leave them widely spaced helps to reduce the windthrow hazard. Only high-value trees should be removed from a strip 50 feet wide along the west and south edges of the woodland. The plant competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, surface compaction, and damage to tree roots. Fire protection measures are needed.

Areas of this soil provide good habitat for wetland wildlife. Shallow water areas are available for use as habitat. Also available are grain and seed crops, wild herbaceous plants, wetland plants, and other important habitat elements.

The land capability classification is IIIw.

92—Sarpy sand. This nearly level, excessively drained soil is on flood plains. In most years it is subject to frequent flooding for long periods from November through June. Individual areas are irregular in shape and range from 5 to 35 acres.

Typically, the surface layer is brown, friable sand about 4 inches thick. The underlying material to a depth of 60 inches or more is brown loose sand and coarse sand. In some areas the surface layer has less sand.

Included with this soil in mapping are small areas of poorly drained Beaucoup soils and somewhat poorly drained Tice soils. Beaucoup and Tice soils have more clay throughout and are in lower positions on the flood plains. Included soils make up 5 to 10 percent of the map unit.

Water and air move through the Sarpy soil at a rapid or very rapid rate. Surface runoff is very slow. Available water capacity is low. Organic matter content is very low. The shrink-swell potential and potential for frost action are low.

In most areas this soil is used as habitat for wetland wildlife. It is well suited to use as habitat for wetland wildlife.

Areas of this soil provide good habitat for wetland wildlife. Most areas are in the Mississippi River Valley. Seed crops, wild herbaceous plants, wetland plants, and other important habitat elements are available for wildlife.

The land capability classification is IVs.

274B—Seaton silt, 2 to 5 percent slopes. This gently sloping, well drained soil is on upland ridgetops. Individual areas are long and narrow and range from 5 to 45 acres.

Typically, the surface layer is brown, friable silt about 7 inches thick. The subsurface layer is dark yellowish brown, friable silt loam about 3 inches thick. The subsoil is about 47 inches thick. The upper part is dark yellowish brown, friable silt loam. The middle part is brown, firm silt loam. The lower part is dark yellowish brown, firm silt loam. The underlying material to a depth of 60 inches or more is dark yellowish brown, friable silt loam. In some areas the subsoil has more clay. In other areas the slope is more than 5 percent. In some places the lower part of the subsoil has mottles.

Water and air move through the Seaton soil at a moderate rate. Surface runoff is slow. Available water capacity is very high. Organic matter content is moderate. The shrink-swell potential is low, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, pasture, and hay.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled, however, by a conservation cropping system, a system of conservation tillage that leaves crop residue on the surface after planting, or contour farming. Returning crop residue to the soil helps to maintain soil tilth and fertility.

Pasture and hay plants, such as orchardgrass, bromegrass, tall fescue, and alfalfa grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Pasture rotation, reseeding, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

The land capability classification is IIe.

274C2—Seaton silt loam, 5 to 10 percent slopes, eroded. This moderately sloping, well drained soil is on convex side slopes and ridgetops in the uplands. Individual areas are long and narrow and range from 3 to 80 acres.

Typically, the surface layer is dark brown, friable silt loam. Erosion has thinned the surface layer to a thickness of about 5 inches. The subsoil is about 41 inches thick. It is dark yellowish brown and yellowish brown, friable silt loam. The underlying material to a depth of 60 inches or more is dark yellowish brown, friable silt loam. In some areas the subsoil has more clay. In other areas carbonates are within a depth of 40 inches. In some places the slope is more than 10 percent. In other places the slope is less than 5 percent.

Water and air move through the Seaton soil at a moderate rate. Surface runoff is medium. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is low, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is moderately suited to cultivated crops. It is well suited to pasture and hay.

If this soil is used for cultivated crops, further erosion is a hazard. A crop rotation in which forage crops are grown for 1 year or more, a conservation tillage system that leaves crop residue on the surface after planting, and contour farming help to control erosion and to maintain soil productivity (fig. 4). Returning crop residue to the soil or regularly adding other organic material helps to maintain soil fertility and soil tilth and to increase the rate of water intake.

Establishing pasture plants or hay helps to control erosion. Orchardgrass, bromegrass, tall fescue, and alfalfa are suited to this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion. Rotation grazing, deferred grazing, and applying fertilizer help to maintain the pasture and to control erosion.

The land capability classification is IIIe.

274D2—Seaton silt loam, 10 to 18 percent slopes, eroded. This strongly sloping, well drained soil is on hillsides and ridgetops in the uplands. Individual areas are irregular in shape and range from 5 to 150 acres.

Typically, the surface layer is brown, friable silt loam. Erosion has thinned the surface layer to a thickness of about 4 inches. The subsoil is friable silt loam about 40 inches thick. The upper part is dark yellowish brown. The lower part is brown. The underlying material to a depth of 60 inches or more is dark yellowish brown, friable silt loam. In some areas the slope is more than 18 percent. In other areas the lower part of the subsoil is mottled. In some places carbonates are within a depth of 40 inches.

Included with this soil in mapping are small areas of Haymond soils, which are on flood plains and which are subject to flooding. These soils make up 5 to 10 percent of the map unit.

Water and air move through the Seaton soil at a moderate rate. Surface runoff is rapid. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is low, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is moderately suited to cultivated crops, pasture, and hay.

If this soil is used for cultivated crops, further erosion is a hazard. A cropping system dominated by forage crops, a conservation tillage system that leaves crop residue on the surface after planting, and contour farming help to control erosion and to maintain soil productivity. Returning crop residue to the soil or regularly adding other organic material helps to maintain soil fertility and soil tilth and to increase the rate of water intake.

Establishing pasture plants or hay helps to keep erosion within tolerable limits. Orchardgrass, bromegrass, tall fescue, and alfalfa are suited to this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. A no-till system of seeding helps to control erosion during pasture establishment. Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

The land capability classification is IIIe.

274F—Seaton silt, 18 to 30 percent slopes. This steep, well drained soil is on upland side slopes. Individual areas are irregular in shape and range from 5 to 100 acres.

Typically, the surface layer is dark grayish brown, very friable silt about 3 inches thick. The subsurface layer is brown, very friable silt loam about 5 inches

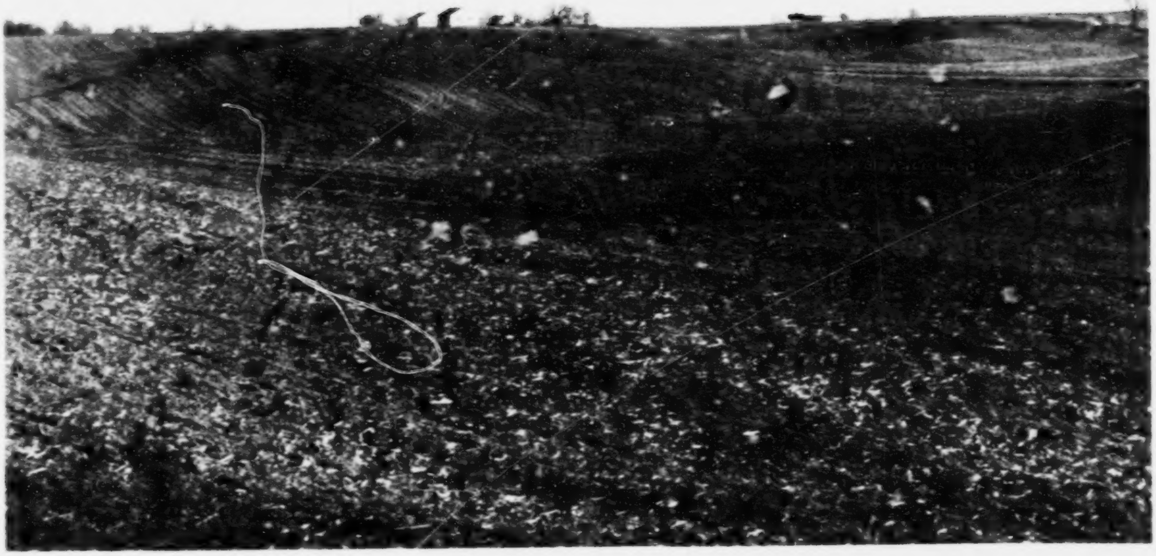


Figure 4.—On Seaton silt loam, 5 to 10 percent slopes, eroded, crop residue left on the surface helps to control erosion and to maintain productivity.

thick. The subsoil is friable silt loam about 34 inches thick. The upper part is dark yellowish brown. The next part is brown. The lower part is strong brown. The underlying material to a depth of 60 inches or more is dark yellowish brown, friable silt loam. In some areas the slope is more than 30 percent. In other areas the subsoil has more clay. In some places carbonates are below a depth of 40 inches.

Included with this soil in mapping are small areas of Goss and Haymond soils. Goss soils are in positions similar to those of the Seaton soil and have coarse fragments throughout. Haymond soils are in drainageways below the Seaton soil and are subject to flooding. Included soils make up 5 to 15 percent of the map unit.

Water and air move through the Seaton soil at a moderate rate. Surface runoff is rapid. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is low, and the potential for frost action is high.

In most areas this soil is used as woodland. In some areas it is used for pasture. It is well suited to use as woodland. It is moderately suited to pasture.

Erosion control is needed when grasses and legumes are established in the pastured areas. A no-till system of seeding helps to control erosion during pasture establishment. A permanent cover of pasture plants helps to control erosion and maintain tilth. Orchardgrass, bromegrass, tall fescue, and alfalfa are suited to this soil. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture and soil in good condition.

If this soil is used as woodland, the erosion hazard, the equipment limitation, and seedling mortality are management concerns. Plant competition is also a management concern. Laying out logging roads and skid trails on the contour and skidding logs or trees uphill with a cable and winch help to control erosion. Seeding bare logging areas to grass or to a grass-legume mixture also helps to control erosion. Firebreaks should be grass. Use of machinery is limited to periods when the soil is firm enough to support its weight. Eliminating all competing vegetation near the seedlings and planting older and larger stock help to reduce seedling mortality. Excluding livestock from the woodland helps to prevent the destruction of leaf mulch and of desirable young trees, surface compaction, and damage to tree roots.

The land capability classification is VIe.

274F3—Seaton silt loam, 18 to 30 percent slopes, severely eroded. This steep, well drained soil is on upland side slopes. Over most of the area, erosion has removed most of the original surface layer and tillage has mixed the rest with the upper part of the subsoil. Individual areas are irregular in shape and range from 5 to 90 acres.

Typically, the surface layer is brown, firm silt loam about 8 inches thick. The subsoil is dark yellowish brown, firm silt loam about 39 inches thick. The underlying material to a depth of 60 inches or more is dark yellowish brown, friable silt loam. In some areas the slope is more than 30 percent. In other areas the surface layer is less eroded. In some places carbonates are within a depth of 40 inches.

Included with this soil in mapping are small areas of well drained Goss and Haymond soils. Goss soils have coarse fragments throughout and are in positions similar to those of the Seaton soil. Haymond soils are in drainageways below the Seaton soil and are subject to flooding. Included soils make up 5 to 15 percent of the map unit.

Water and air move through the Seaton soil at a moderate rate. Surface runoff is rapid. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is low, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is generally unsuited to use as cropland because of the slope and erosion hazard. It should be seeded to grass or planted to trees. It is well suited to use as woodland and moderately suited to use as pasture.

If this soil is used as woodland, the erosion hazard, the equipment limitation, and seedling mortality are management concerns. Plant competition also is a management concern. Laying out logging roads and skid trails on the contour and skidding logs or trees uphill with a cable and winch help to control erosion. Seeding bare logging areas to grass or to a grass-legume mixture also helps to control erosion. Firebreaks should be grass. Use of machinery is limited to periods when the soil is firm enough to support its weight. Planting stock that is older and larger than is typical and eliminating competing vegetation near the seedlings help to reduce seedling mortality. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, surface compaction, and damage to tree roots.

Erosion control is needed when grasses and legumes are established in the pastured areas. A no-till system of seeding helps to control erosion during the establishment period. A permanent cover of pasture plants helps to control erosion and maintain tilth. Orchardgrass, bromegrass, tall fescue, and alfalfa are suited to this soil. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture and soil in good condition.

The land capability classification is VIIe.

274G—Seaton silt, 30 to 60 percent slopes. This very steep, well drained soil is on upland side slopes. Individual areas are irregular in shape and range from 5 to 200 acres.

Typically, the surface layer is brown and very dark grayish brown, friable silt about 4 inches thick. The subsurface layer is yellowish brown, friable silt about 4 inches thick. The subsoil is yellowish brown and dark yellowish brown, friable silt loam about 40 inches thick. The underlying material to a depth of 60 inches or more is yellowish brown, friable silt loam. In some areas the subsoil has more clay. In other areas carbonates are at a depth of less than 40 inches.

Included with this soil in mapping are small areas of well drained Goss and Haymond soils. Goss soils are in similar positions to those of the Seaton soil, and have coarse fragments throughout. Haymond soils are in drainageways below the Seaton soil and are subject to flooding. Included soils make up 10 to 15 percent of the map unit.

Water and air move through the Seaton soil at a moderate rate. Surface runoff is very rapid. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is low, and the potential for frost action is high.

In most areas this soil is used as woodland. It is well suited to use as habitat for woodland wildlife.

If this soil is used as woodland, the erosion hazard, the equipment limitation, and seedling mortality are management concerns. Plant competition also is a management concern. Laying out logging roads and skid trails on the contour and skidding logs or trees uphill with a cable and winch help to control erosion. Seeding bare logging areas to grass or to a grass-legume mixture also helps to control erosion. Firebreaks should be grass. Use of machinery is limited to periods when the soil is firm enough to support its weight. Planting stock that is older and larger than is typical and eliminating competing vegetation near the seedlings help to reduce seedling mortality. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, surface compaction, and damage to tree roots.

In the areas used for wildlife habitat, excluding livestock helps to prevent depletion of shrubs and sprouts that provide food and cover for woodland wildlife, such as deer, turkeys, squirrels, and a variety of songbirds. Planting hedges and rows of shrubs provides cover for doves and many songbirds.

The land capability classification is VIIe.

278A—Stronghurst silt loam, 0 to 3 percent slopes. This nearly level, somewhat poorly drained soil is on ridgetops in the uplands. Individual areas are irregular in shape and range from 10 to 100 acres.

Typically, the surface layer is brown, friable silt loam about 10 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is pale brown, mottled, friable silt loam. The middle part is pale brown, mottled, firm silty clay loam. The lower part is light brownish gray, mottled, firm silty clay loam. In some areas the soil is better drained. In other areas the seasonal high water table is within a depth of 1 foot. In some places the soil has a slope of more than 3 percent.

Water and air move through the Stronghurst soil at a moderate rate. Surface runoff is slow. In most years the seasonal high water table is at a depth of 1 to 3 feet from April through June. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops and to pasture and hay.

In areas used for corn, soybeans, or small grain, wetness is a limitation. Surface ditches and subsurface drains help to lower the seasonal high water table. Keeping tillage to a minimum and returning crop residue to the soil help to maintain soil tilth and soil fertility.

If this soil is used for pasture and hay, the seasonal high water table is a limitation. Surface ditches and subsurface drains help to remove excess water. Orchardgrass, bromegrass, tall fescue, alfalfa, and alsike clover are suited to this soil. Overgrazing reduces forage yields and causes surface compaction and poor soil tilth. Restricted use during wet periods helps to maintain the pasture and hayland.

The land capability classification is IIw.

279C2—Rozetta silt loam, 4 to 10 percent slopes, eroded. This moderately sloping, moderately well drained soil is on side slopes. Individual areas are irregular in shape and range from 10 to 40 acres in size.

Typically, the surface layer is brown, friable silt loam. Erosion has thinned the surface layer to a thickness of about 7 inches. The subsoil is dark yellowish brown and about 38 inches thick. The upper part is friable silty clay loam. The middle part is mottled, firm silty clay loam. The lower part is mottled, firm silt loam. The underlying material to a depth of 60 inches or more is dark yellowish brown, mottled, friable silt loam. In some areas the slope is more than 10 percent.

Included with this soil in mapping are small areas of somewhat poorly drained Stronghurst soils. These soils are in positions higher than those of Rozetta soil. They make up 5 to 10 percent of the map unit.

Water and air move through the Rozetta soil at a moderate rate. Surface runoff is medium. The seasonal high water table is 4 to 6 feet below the surface during spring. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is moderately suited to cultivated crops, pasture, and hay.

If this soil is used for cultivated crops, further erosion is a hazard. A crop rotation in which forage crops are grown for 1 year or more, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, and terraces help to control erosion and to maintain soil productivity. Returning crop residue to the soil or regularly adding other organic material helps to maintain soil fertility and soil tilth and to increase the rate of water intake.

Establishing pasture plants or hay helps to control erosion. Orchardgrass, bromegrass, tall fescue, and alfalfa are suited to this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Rotation grazing, deferred grazing, and applying fertilizer help to maintain the pasture and to control erosion.

The land capability classification is IIIe.

279D3—Rozetta silty clay loam, 10 to 15 percent slopes, severely eroded. This strongly sloping, moderately well drained soil is on upland side slopes. Over most of the area, erosion has removed most of the original surface layer and tillage has mixed the rest with the upper part of the subsoil. Individual areas are irregular in shape and range from 5 to 30 acres.

Typically, the surface layer is dark grayish brown and dark yellowish brown, friable silty clay loam about 4 inches thick. The subsoil is yellowish brown, firm silty clay loam about 38 inches thick. It is mottled in the lower part. The underlying material to a depth of 60 inches or more is brown, mottled, friable silt loam. In some areas the surface layer is thicker. In other areas the slope is less than 10 percent.

Water and air move through the Rozetta soil at a moderate rate. Surface runoff is rapid. The seasonal high water table is 4 to 6 feet below the surface during spring. Available water capacity is high. Organic matter content is low. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for pasture. It is moderately suited to pasture and hay. It generally is unsuited to cultivated crops because of the erosion hazard.

Establishing pasture plants or hay on this soil helps to prevent excessive erosion. Orchardgrass, bromegrass, tall fescue, and alfalfa are suited to this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion. Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and to control erosion.

If this soil is used as woodland, plant competition is a management concern. It affects the seedlings of desirable species. Competing vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, surface compaction, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is VIe.

280B—Fayette silt loam, 1 to 5 percent slopes. This gently sloping, well drained soil is on ridgetops in the uplands. Individual areas are long and narrow and range from 5 to 45 acres.

Typically, the surface layer is brown, friable silt loam about 7 inches thick. The subsurface layer also is brown, friable silt loam about 7 inches thick. The subsoil is dark yellowish brown and about 34 inches thick. The upper part is friable silt loam. The middle part is firm silty clay loam. The lower part is firm silt loam. The underlying material to a depth of 60 inches or more is dark yellowish brown, friable silt loam. In some areas the subsoil has less clay. In other areas the slope is more than 5 percent. In some places the lower part of the subsoil has mottles.

Included with this soil in mapping are small areas of somewhat poorly drained Stronghurst soils in slight depressions. These soils make up less than 5 percent of the map unit.

Water and air move through the Fayette soil at a moderate rate. Surface runoff is slow. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, pasture, and hay.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled, however, by a conservation cropping system, a conservation tillage system that leaves crop residue on the surface after planting, or contour farming. Returning crop residue to the soil helps to maintain tilth and fertility.

Pasture plants and hay grow well on this soil. Orchardgrass, bromegrass, tall fescue, and alfalfa are suited. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Rotation grazing, reseeding, deferred grazing, and applying fertilizer help to maintain the pasture and to control erosion.

The land capability classification is IIe.

280C2—Fayette silt loam, 5 to 10 percent slopes, eroded. This moderately sloping, well drained soil is on ridgetops in the uplands. Individual areas are long and narrow and range from 5 to 80 acres.

Typically, the surface layer is brown, friable silt loam. Erosion has thinned the surface layer to a thickness of about 4 inches. The subsurface layer is brown, friable silt loam about 4 inches thick. The subsoil is firm silty clay loam and extends to below a depth of 60 inches. The upper part is dark yellowish brown. The lower part is yellowish brown. In some areas the subsoil has less clay. In other areas carbonates are within a depth of 40 inches. In some places slopes are less than 5 percent. In other places the subsoil is redder. In some areas mottles are below a depth of 40 inches.

Water and air move through the Fayette soil at a moderate rate. Surface runoff is medium. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is moderately suited to cultivated crops. It is well suited to pasture and hay.

If this soil is used for cultivated crops, further erosion is a hazard. A crop rotation in which forage crops are grown for 1 year or more, a conservation tillage system that leaves crop residue on the surface after planting, and contour farming help to control erosion and to maintain soil productivity. Returning crop residue to the soil or regularly adding other organic material helps to maintain soil fertility and soil tilth and to increase the rate of water intake.

Establishing pasture plants or hay helps to prevent excessive erosion. Orchardgrass, bromegrass, tall fescue, and alfalfa are suited to this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Rotation grazing, deferred grazing, and applying fertilizer help to maintain the pasture and to control erosion.

The land capability classification is IIIe.

280D2—Fayette silt loam, 10 to 18 percent slopes, eroded. This strongly sloping, well drained soil is on upland hillsides and ridgetops. Individual areas are irregular in shape and range from 5 to 100 acres.

Typically, the surface layer is brown, friable silt loam. Erosion has thinned the surface layer to a thickness of about 5 inches. The subsurface layer is brown and dark yellowish brown, friable silt loam about 5 inches thick. The subsoil is dark yellowish brown and about 39 inches thick. The upper part is friable silty clay loam. The middle part is firm silty clay loam. The lower part is friable silt loam. The underlying material to a depth of 60 inches or more is dark yellowish brown, friable silt loam. In some areas the slope is more than 18 percent. In other areas the lower part of the subsoil is mottled. In some places carbonates are within a depth of 40 inches. In other places the profile has less clay.

Included with this soil in mapping are small areas of Haymond soils on flood plains. These soils make up less than 5 percent of the map unit.

Water and air move through the Fayette soil at a moderate rate. Surface runoff is rapid. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is poorly suited to cultivated crops. It is moderately suited to pasture and hay.

If this soil is used for cultivated crops, further erosion is a severe hazard. A crop rotation dominated by forage crops, a conservation tillage system that leaves crop residue on the surface after planting, and contour farming help to control erosion and maintain soil productivity. Returning crop residue to the soil or regularly adding other organic material helps to maintain soil fertility and soil tilth and to increase the rate of water intake.

Establishing pasture plants or hay helps to control erosion. Orchardgrass, bromegrass, tall fescue, and alfalfa are suited to this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Rotation grazing, deferred grazing, and applications of fertilizer help to maintain the pasture and to control erosion.

The land capability classification is IVe.

284—Tice silt loam. This nearly level, somewhat poorly drained soil is on flood plains. In most years it is occasionally flooded for brief periods from January to June. Individual areas are irregular in shape and range from 10 to 200 acres.

Typically, the surface layer is very dark grayish brown, friable silt loam about 6 inches thick. The subsurface layer is very dark grayish brown, friable silt loam and silty clay loam about 11 inches thick. The subsoil is about 40 inches thick. The upper part is grayish brown, firm silty clay loam. The middle part is brown, mottled, very firm silty clay loam. The lower part is grayish brown, mottled, firm silt loam. The underlying material to a depth of 60 inches or more is grayish brown, mottled, firm silt loam. In some areas the surface layer is silty clay loam. In other areas the surface layer is light colored and the subsoil has a lower clay content. In some places the subsoil has more clay.

Included with this soil in mapping are small areas of poorly drained Beaucoup soils. These soils are lower on the flood plains than the Tice soil. They make up less than 5 percent of the map unit.

Water and air move through the Tice soil at a moderate rate. Surface runoff is slow. In most years the seasonal high water table is at a depth of 1.5 to 3 feet from March to June. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, pasture, and hay.

In areas used for corn, soybeans, or small grain, the seasonal high water table is a limitation. Surface drains help to remove excess surface water. Subsurface drains help to lower the seasonal high water table. Flooding occasionally damages crops, especially small grain. Dikes and levees help reduce crop damage caused by floodwater. Keeping tillage at a minimum and returning crop residue to the soil help to maintain soil tilth and soil fertility.

If this soil is used for pasture and hay, a drainage system is needed. Surface drains help to remove excess surface water. Subsurface drains help to lower the seasonal high water table. Orchardgrass, bromegrass, tall fescue, alfalfa, and alsike clover are suited to this soil. Overgrazing reduces forage yields, compacts the surface, and causes poor soil tilth. Restricted use during wet periods helps to maintain the pasture.

The land capability classification is IIw.

331—Haymond silt. This nearly level, well drained soil is on flood plains of upland stream valleys. In most years it is subject to frequent flooding for brief periods from January through May. Individual areas are irregular in shape and range from 3 to 40 acres.

Typically, the surface layer is brown, friable silt about 8 inches thick. The subsoil is brown and dark yellowish brown, friable silt loam about 27 inches thick. The underlying material to a depth of 60 inches or more is dark yellowish brown, friable silt loam. In some areas the surface soil is darker. In other areas coarse fragments are below a depth of 40 inches. In some places the profile is calcareous throughout.

Included with this soil in mapping are small areas of well drained Drury soils and somewhat poorly drained Wakeland soils. Drury soils are in higher positions on foot slopes and alluvial fans. Wakeland soils are lower on the flood plains than the Haymond soil. Included soils make up 5 to 15 percent of the map unit.

Water and air move through the Haymond soil at a moderate rate. Surface runoff is very slow. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is low, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, pasture, and hay and to use as habitat for openland wildlife.

If this soil is used for corn or soybeans, diversions help to reduce the extent of the crop damage caused by runoff from the higher adjacent areas. Keeping tillage to a minimum and returning crop residue to the soil or regularly adding other organic material help to maintain soil tilth and soil fertility.

Orchardgrass, bromegrass, tall fescue, and alfalfa are suitable pasture plants on this soil. Overgrazing compacts the surface and causes poor soil tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to maintain the pasture. In areas used for hay, flooding delays harvesting in some years.

The land capability classification is IIw.

333—Wakeland silt loam. This nearly level, somewhat poorly drained soil is on flood plains. In most years it is subject to frequent flooding for brief periods from January to May. Individual areas are irregular in shape and range from 5 to 1,000 acres.

Typically, the surface layer is brown, friable silt loam about 9 inches thick. The underlying material to a depth of 60 inches or more is stratified dark grayish brown, grayish brown, and light brownish gray, friable silt loam, loam, and very fine sandy loam. It is mottled in the upper part. In some areas a dark colored buried soil is within a depth of 40 inches. In other areas gravel is below a depth of 40 inches. In some places the seasonal high water table is at a depth of less than 1 foot. In other places the profile is not as gray. In a few places the surface layer is darker and the profile has a higher content of clay.

Included with this soil in mapping are small areas of well drained Seaton soils on side slopes adjacent to the flood plains. These soils make up less than 5 percent of the map unit.

Water and air move through the Wakeland soil at a moderate rate. Surface runoff is slow. In most years the seasonal high water table is at a depth of 1 to 3 feet from January to April. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is low, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, pasture, and hay.

In areas used for corn or soybeans, the seasonal high water table is a limitation and flooding is a hazard. Surface drains help to remove excess surface water. Constructing diversions helps to control flooding from adjacent uplands. Dikes and levees help to protect crops from damage caused by floodwater. Keeping tillage to a minimum and returning crop residue to the soil help to maintain soil tilth and soil fertility.

If this soil is used for pasture and hay, a drainage system is needed. Surface ditches and subsurface drains help to lower the seasonal high water table. Orchardgrass, bromegrass, tall fescue, alfalfa, and alsike clover are suited to this soil. Overgrazing reduces forage yields, compacts the surface, and causes poor soil tilth. Restricting grazing during wet periods helps to maintain the pasture.

The land capability classification is IIw.

338—Hurst silt loam. This nearly level, somewhat poorly drained soil is on terraces. This map unit is in a single area that is irregular in shape and about 325 acres in size.

Typically, the surface layer is grayish brown, friable silt loam about 8 inches thick. The subsurface layer is grayish brown, friable silt loam about 6 inches thick. The subsoil is about 29 inches thick. The upper part is brown, firm silty clay loam and silty clay. The middle part is brown, mottled, firm silty clay. The lower part is dark grayish brown, mottled, friable clay loam. The underlying material to a depth of 60 inches or more is dark grayish brown, mottled, friable sandy clay loam. In some places the subsoil is lower in clay content. In other places the surface layer has more sand.

Included with this soil in mapping are small areas of well drained Oakville and Okaw soils. Oakville soils have a higher content of sand throughout and are on small dunes above the Hurst soil. Okaw soils are in similar but slightly lower positions than those of the Hurst soil. Included soils make up 5 to 10 percent of the map unit.

Water and air move at a moderately slow rate through the upper part of the Hurst soil and at a very slow rate in the lower part. Surface runoff is slow. The seasonal high water table is 1 to 3 feet below the surface during spring. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is high, and the potential for frost action is moderate.

In most areas this soil is used for cultivated crops. It is moderately suited to cultivated crops, pasture, and hay and to use as woodland.

In areas used for corn, soybeans, or small grain, the seasonal high water table is a limitation. Surface drains help to remove excess surface water. Measures that maintain the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil help to maintain soil tilth and soil fertility.

If this soil is used for pasture and hay, a drainage system is needed. Installing surface drains helps to remove excess surface water. Orchardgrass, bromegrass, tall fescue, alfalfa, and alsike clover are suited to this soil. Overgrazing reduces forage yields, compacts the surface, and causes poor soil tilth.

If this soil is used as woodland, seedling mortality and the windthrow hazard are management concerns. Planting stock that is older and larger than is typical and mulching help to reduce seedling mortality. Using harvesting methods that do not isolate the remaining trees or leave them widely spaced helps to reduce windthrow. Only high-value trees should be removed from a strip 50 feet wide along the west and south edges of the woodland. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, surface compaction, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is IIIw.

415—Orion silt loam. This nearly level, somewhat poorly drained soil is on flood plains. In most years it is subject to frequent flooding for brief periods from March to May. Individual areas are irregular in shape and range from 5 to 100 acres.

Typically, the surface layer is brown, friable silt loam about 6 inches thick. The underlying material is brown, friable silt loam about 16 inches thick. It is mottled in the lower part. A buried soil is at a depth of about 22 inches and extends below a depth of 60 inches. It is very dark gray, friable silt loam. In some areas it is above a depth of 20 inches. In other areas the slope is more than 2 percent.

Included with this soil in mapping are small areas of poorly drained Beaucoup soils and well drained Seaton soils. Beaucoup soils have a darker surface layer, have more clay throughout, and are in positions similar to those of the Orion soil. Seaton soils are on adjacent side slopes above the Orion soil. Included soils make up 5 to 10 percent of the map unit.

Water and air move through the Orion soil at a moderate rate. Surface runoff is slow. In most years the seasonal high water table is at a depth of 1 to 3 feet from November to May. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is low, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, to pasture, and to hay.

In areas used for corn or soybeans, the seasonal high water table is a limitation and flooding is a hazard. Surface drains help to remove excess surface water. Constructing diversions helps to control flooding from adjacent uplands. Keeping tillage to a minimum and returning crop residue to the soil help to maintain soil tilth and soil fertility.

If this soil is used for pasture and hay, a drainage system is needed. Surface ditches help to remove excess surface water. Orchardgrass, bromegrass, tall fescue, alfalfa, and alsike clover are suited to this soil. Overgrazing reduces forage yields, compacts the surface, and causes poor soil tilth. Restricting use during wet periods helps to maintain the pasture.

The land capability classification is IIw.

430B—Raddle silt loam, 1 to 5 percent slopes. This gently sloping, well drained soil is on toe slopes and alluvial fans. Individual areas are long and narrow and range from 5 to 200 acres.

Typically, the surface soil is dark brown, friable silt loam about 12 inches thick. The subsoil extends to below a depth of 60 inches. It is dark yellowish brown silt loam. The upper part is friable, and the lower part is firm. In some areas the lower part of the subsoil has more sand. In other areas the surface layer is not as dark.

Included with this soil in mapping are small areas of well drained Haymond soils. These soils do not have a dark surface layer and are lower on the flood plains than the Raddle soil. They make up 5 to 10 percent of the map unit.

Water and air move through the Raddle soil at a moderate rate. Surface runoff is medium. Available water capacity is very high. Organic matter content is moderate. The shrink-swell potential is low, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, pasture, and hay.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, or a conservation cropping system.

Pasture plants and hay grow well on this soil. Orchardgrass, bromegrass, tall fescue, and alfalfa are suited. Overgrazing reduces forage yields, compacts the surface, causes excessive runoff, and increases the hazard of erosion. Rotation grazing, deferred grazing, reseeding, and applying fertilizer help to maintain the pasture and to control erosion.

The land capability classification is IIe.

457—Booker clay. This nearly level, very poorly drained soil is on terraces. In most years it is subject to rare flooding for brief periods from April to July. Individual areas are irregular in shape and range from 10 to 80 acres.

Typically, the surface layer is very dark gray, firm clay about 9 inches thick. The mottled subsoil extends to a depth below 60 inches. The upper part is very dark gray, firm clay. The middle part is very dark gray, very firm clay. The lower part is dark gray, extremely firm clay. In some areas the soil profile has less clay. In other areas the surface layer is not as dark.

Included with this soil in mapping are small areas of poorly drained Beaucoup soils. These soils have less clay in the profile, are subject to occasional flooding, and are on flood plains below the Booker soil. They make up 5 to 10 percent of the map unit.

Water and air move through the Booker soil at a very slow rate. Surface runoff is very slow or ponded. The seasonal high water table is between 0.5 foot above the surface and 1 foot below in spring. Available water capacity is moderate. Organic matter content also is moderate. The shrink-swell potential is very high, and the potential for frost action is moderate.

In most areas this soil is used for cultivated crops. It is well suited to use as habitat for wetland wildlife. It is moderately suited to cultivated crops, pasture, and hay.

This soil is sufficiently drained for the commonly grown crops. In areas used for corn, soybeans, or small grain, the seasonal high water table delays planting in some years. Surface drains help to remove excess surface water. Measures that maintain the drainage system are needed. Keeping tillage to a minimum and returning crop residue to the soil help to maintain soil tilth and soil fertility.

Areas of this soil provide good habitat for wetland wildlife. They are in the Illinois River Valley, so shallow water areas generally are available and others can easily be developed. Also available are grain and seed crops, wild herbaceous plants, wetland plants, and other important habitat elements.

The land capability classification is IIIw.

504G—Sogn flaggy silt loam, 30 to 65 percent slopes. This very steep, shallow, somewhat excessively drained soil is on hillsides in the uplands (fig. 5). Individual areas are irregular in shape and range from 5 to 30 acres.

Typically, the surface layer is very dark brown, friable flaggy silt loam. Bedded limestone bedrock is at a depth of about 7 inches. In some areas the depth to bedrock is more than 20 inches. In other areas the surface layer is lighter in color.

Included with this soil in mapping are small areas of well drained Goss and Seaton soils. These soils have

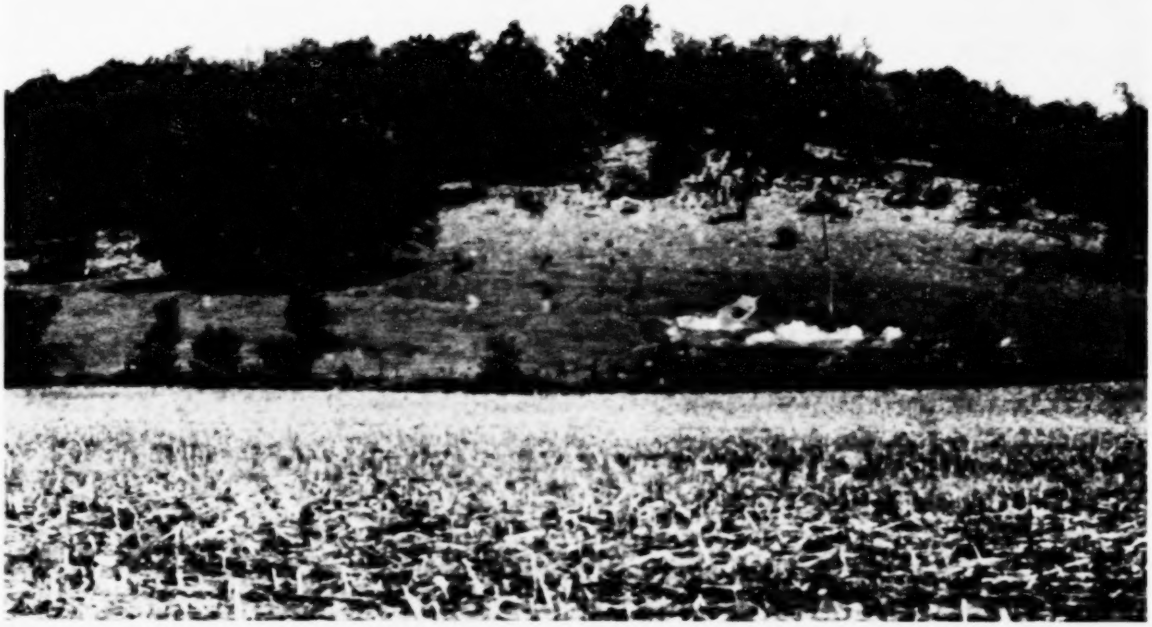


Figure 5.—Sogn flaggy silt loam, 30 to 65 percent slopes, in the background, is shallow to bedrock and supports a sparse stand of trees. Raddle silt loam, 1 to 5 percent slopes, is in the foreground.

thicker soil layers above the bedrock and are in positions similar to those of the Sogn soil. They make up 10 to 15 percent of the map unit.

Water and air move through the Sogn soil at a moderate rate. Surface runoff is very rapid. Available water capacity is very low. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

In most areas this soil supports sparse stands of trees, mainly eastern redcedar. It generally is unsuited to most agronomic and woodland uses because of the slope and depth to bedrock.

This soil supports a minimal amount of the trees, shrubs, and sprouts that provide food and cover for openland wildlife and a variety of songbirds. Excluding livestock helps to prevent destruction of the leaf mulch and the vegetative surface cover.

The land capability classification is VIIs.

580D3—Fayette silty clay loam, karst, 5 to 15 percent slopes, severely eroded. This moderately sloping and strongly sloping, well drained soil is on side slopes of sinkholes and along narrow ridges between sinkholes (fig. 6). Over most of the area, erosion has removed most of the original surface layer and tillage has mixed the rest with the upper part of the subsoil. Individual areas are irregular in shape and range from 5 to 200 acres.

Typically, the surface layer is brown and dark yellowish brown, friable silty clay loam about 7 inches thick. The subsoil is firm, dark yellowish brown, and about 31 inches thick. The upper part is silty clay loam. The lower part is silt loam. The underlying material to a depth of 60 inches or more is dark yellowish brown, friable silt loam. In some areas the slope is more than 15 percent. In areas where erosion has been less severe, the surface layer is silt loam.

Included with this soil in mapping are small areas of well drained Haymond soils and somewhat poorly drained Wakeland soils. Haymond and Wakeland soils are at the bottom of some sinkholes and are subject to flooding. Also included are small areas of poorly drained soils and soils in areas that pond water for long periods. Included soils make up 5 to 10 percent of the map unit.

Water and air move through the Fayette soil at a moderate rate. Surface runoff is slow to rapid. Available water capacity is high. Organic matter content is very low. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for hay. It is moderately suited to pasture and hay. It is poorly suited to cultivated crops. It is well suited to use as woodland.

If this soil is used for cultivated crops, further erosion is a severe hazard. A crop rotation dominated by forage crops and a conservation tillage system that leaves crop residue on the surface after planting help to control erosion and to maintain soil productivity. Returning crop residue to the soil or regularly adding other organic material helps to maintain soil fertility and soil tilth and to increase the rate of water intake.

Establishing pasture plants or hay helps to control erosion. Orchardgrass, bromegrass, tall fescue, and alfalfa are suited to this soil. Overgrazing reduces forage yields, compacts the surface, causes excessive runoff, and increases the hazard of erosion. Rotation grazing, deferred grazing, and applying fertilizer help to maintain the pasture and to control erosion.

If this soil is used as woodland, plant competition is a management concern. It affects the seedlings of desirable species. Competing vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, surface compaction, and damage to tree roots. Fire protection measures are needed.

Some areas of this soil are unstable. They may subside further and develop into sinkholes. Ground water pollution is a hazard if contaminated material in runoff enters the open sinks.

The land capability classification is IVe.

606F—Goss cherty silt loam, 15 to 30 percent slopes. This steep, well drained soil is on side slopes in the uplands. Individual areas are irregular in shape and range from 5 to 80 acres.

Typically, the surface layer is very dark grayish brown, friable cherty silt loam about 4 inches thick. The subsurface layer is brown, friable cherty silt loam about 6 inches thick. The subsoil extends below a depth of 60 inches. The upper part is strong brown, firm very cherty silty clay loam. The lower part is yellowish red, firm very cherty silty clay. In some areas the upper part of the soil profile is not cherty. In other areas the slope is more than 30 percent.

Included with this soil in mapping are small areas of Seaton soils. These soils have less clay throughout, do not have coarse fragments in the profile, and are upslope from the Goss soil. They make up 5 to 10 percent of the map unit.

Water and air move at a moderately rapid rate through the upper part of the Goss soil and at a moderate rate through the lower part. Surface runoff is rapid. Available water capacity is low. Organic matter content is moderately low. The shrink-swell potential and the potential for frost action are moderate.

In most areas this soil is used as woodland. It is well suited to use as habitat for woodland wildlife. It is moderately suited to use as woodland.

If this soil is used as woodland, the slope is a management concern. It limits the use of equipment. Seedling mortality is a concern because of the low available water capacity. Laying out logging roads on the contour and skidding logs and trees uphill with a cable and winch help to control erosion. Planting stock that is older and larger than is typical and planting in furrows help to overcome seedling mortality. Fire protection helps to prevent damage to trees and destruction of the leaf mulch.

In areas used as habitat for wildlife, measures that exclude livestock are needed. These measures help to prevent depletion of the shrubs and sprouts that provide food and cover for woodland wildlife, such as deer, turkeys, squirrels, and a variety of songbirds. Planting hedges and rows of shrubs provides cover for doves and many songbirds.

The land capability classification is VIIs.

606G—Goss cherty silt loam, 30 to 70 percent slopes. This very steep, well drained soil is on side slopes in the uplands. Individual areas are irregular in shape and range from 5 to 160 acres.

Typically, the surface layer is very dark grayish

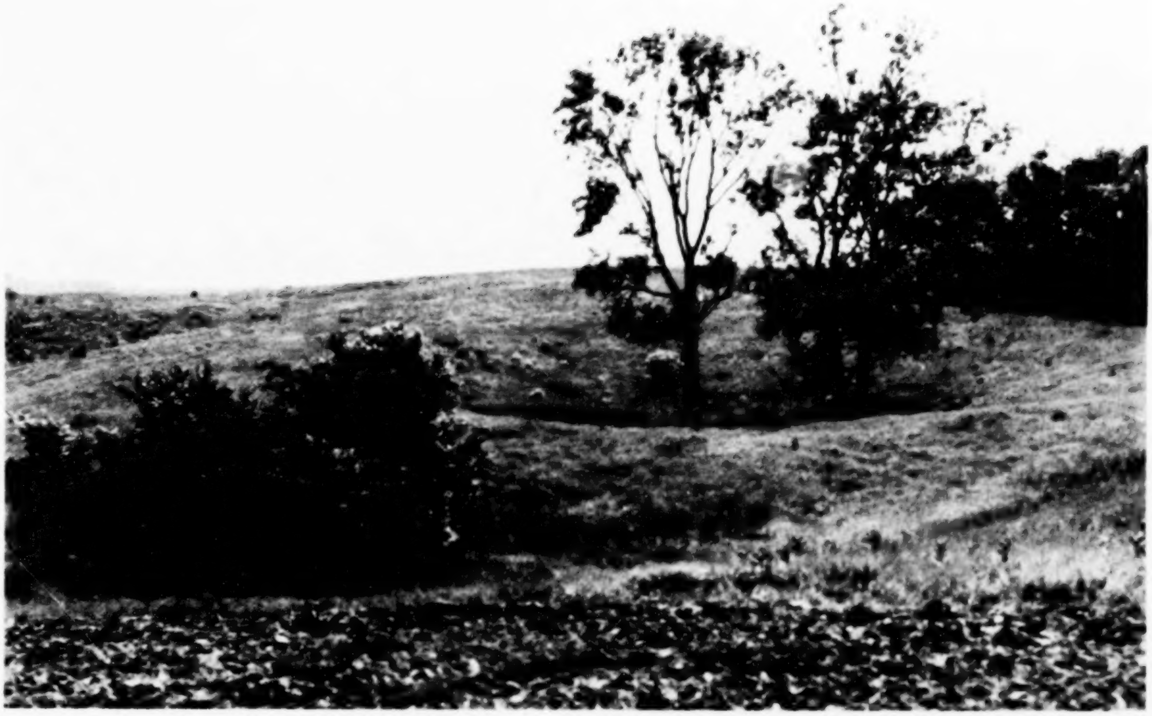


Figure 6.—Numerous sinkholes and narrow, interconnecting ridges in an area of Fayette silty clay loam, karst, 5 to 15 percent slopes, severely eroded.

brown, friable cherty silt loam about 2 inches thick. The subsurface layer is brown, friable cherty silt loam about 8 inches thick. The subsoil extends to below a depth of 60 inches. The upper part is strong brown, firm cherty silt loam. The middle part is yellowish red, firm very cherty silty clay loam and very cherty silty clay. The lower part is yellowish red, very firm cherty silty clay. In some areas the upper part of the profile is not cherty. In other areas the slope is less than 30 percent.

Included with this soil in mapping are small areas of Seaton soils. These soils have less clay throughout, do not have coarse fragments in the profile, and are upslope from the Goss soil. They make up 5 to 10 percent of the map unit.

Water and air move at a moderately rapid rate through the upper part of the Goss soil and at a moderate rate in the lower part. Surface runoff is very rapid. Available water capacity is low. Organic matter content is moderately low. The shrink-swell potential and the potential for frost action are moderate.

In most areas this soil is used as woodland. It is well suited to use as habitat for woodland wildlife and moderately suited to use as woodland.

If this soil is used as woodland, the erosion hazard and the equipment limitation are management concerns because of the slope. Seedling mortality is a concern because of the low available water capacity. Laying out logging roads on the contour and skidding logs and trees uphill with a cable and winch help to control erosion. Seeding bare areas to grass or a grass-legume mixture after completion of logging operations also helps to control erosion. Planting stock that is older and larger than is typical helps to overcome seedling mortality. Fire protection helps to prevent damage to trees and the destruction of leaf mulch.

In areas used as habitat for wildlife, excluding livestock helps to prevent depletion of the shrubs and sprouts that provide food and cover for woodland wildlife, such as deer, turkeys, squirrels, and a variety of songbirds. Planting hedges and rows of shrubs provides cover for doves and many songbirds.

The land capability classification is VIIs.

741A—Oakville loamy fine sand, loamy substratum, 0 to 3 percent slopes. This nearly level, well drained soil is on terraces. Individual areas are irregular in shape and range from 5 to 100 acres.

Typically, the surface layer is very dark grayish brown, very friable loamy fine sand about 7 inches thick. The subsoil is very friable and about 32 inches thick. The upper part is dark brown loamy fine sand. The middle part is brown fine sand. The lower part is yellowish brown and dark yellowish brown fine sand. The underlying material to a depth of 60 inches or more is brown and dark yellowish brown, mottled, very friable and friable, stratified fine sand, loam, and silty clay loam. In some areas the underlying material is not stratified. In other areas the soil profile has more clay throughout.

Included with this soil in mapping are small areas of somewhat poorly drained Hurst and Orion soils. These soils have more clay and less sand in the subsoil and are in positions similar to those of the Oakville soil. Included soils make up less than 10 percent of the map unit.

Water and air move at a rapid rate through the upper part of the Oakville soil and at a moderately slow rate in the lower part. Surface runoff is very slow. Available water capacity and organic matter content are low. The shrink-swell potential and potential for frost action also are low.

In most areas this soil is used for cultivated crops or orchards. It is poorly suited to cultivated crops. It is moderately suited to use as orchards, pasture, hayland, and woodland.

If this soil is used for corn, soybeans, or small grain, soil blowing is a hazard and the low available water capacity is a limitation. Field windbreaks and crop residue management help to control soil blowing. Leaving crop residue on the surface helps to conserve soil moisture and to maintain soil tilth and fertility.

In the areas used for orchards, the low available water capacity is a limitation, especially during the establishment period. A mulch helps to conserve soil moisture. Seeding grass between the rows helps to control soil blowing.

In areas used for pasture or hay, the low available water capacity is a limitation. Orchardgrass, bromegrass, tall fescue, and alfalfa are suited to this soil. Rotation grazing, deferred grazing until grasses reach a minimum grazing height, and applying fertilizer help to maintain the pasture.

The land capability classification is IIIs.

741D2—Oakville loamy fine sand, loamy substratum, 10 to 15 percent slopes, eroded. This strongly sloping, well drained soil is on terrace breaks. Individual areas are long and narrow and range from 10 to 30 acres.

Typically, the surface layer is dark brown, very friable loamy fine sand. Erosion has thinned the surface layer to a thickness of about 7 inches. The subsoil is about 38 inches thick. The upper part is brown, very friable loamy sand. The lower part is yellowish brown, very friable fine sand. The underlying material to a depth of 60 inches or more is brown and yellowish brown, mottled, very friable, stratified fine sand and sandy clay loam. In some areas the underlying material has a higher content of sand. In other areas the slope is more than 15 percent.

Included with this soil in mapping are small areas of somewhat poorly drained Hurst soils and poorly drained Okaw soils. Hurst and Okaw soils have more clay throughout and are in higher positions on the terraces than those of the Oakville soil. Included soils make up 5 to 10 percent of the map unit.

Water and air move at a rapid rate through the upper part of the Oakville soil and at a moderately slow rate in the lower part. Surface runoff is rapid. Available water capacity and organic matter content are low. The shrink-swell potential and the potential for frost action also are low.

In most areas this soil is used for pasture, hay, or cultivated crops. It is poorly suited to use as pasture, hayland, and orchards. It generally is unsuited to cultivated crops because of droughtiness and the hazards of soil blowing and water erosion.

In areas used for pasture and hay, the low available water capacity is a limitation. Orchardgrass, bromegrass, tall fescue, and alfalfa are suited to this soil. Rotation grazing, deferred grazing until grasses reach a minimum grazing height, and applying fertilizer help to maintain the pasture.

If this soil is used as woodland, seedling mortality is a management concern because of the low available water capacity. Planting stock that is older and larger than is typical and mulching help to reduce seedling mortality. Some replanting may be needed. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, surface compaction, and damage to tree roots. Measures that protect the woodland from fire are needed.

In areas used as orchards, the low available water capacity is a limitation and soil blowing and water erosion are hazards, especially during the establishment period. A mulch helps to conserve soil moisture. Laying out rows on the contour and seeding grass between the rows help to control soil blowing and water erosion.

The land capability classification is VIs.

785G—Lacrescent very flaggy silt loam, 30 to 70 percent slopes. This very steep, well drained soil is at the base of limestone bluffs. Individual areas are long and narrow and range from 10 to 100 acres.

Typically, the surface layer is very dark brown, friable, calcareous very flaggy silt loam about 9 inches thick. The subsurface layer is dark brown, friable, calcareous very flaggy silt loam about 9 inches thick. The subsoil is brown, friable, calcareous extremely flaggy silty clay loam about 18 inches thick. The underlying material to a depth of 60 inches or more is dark brown, friable, calcareous very flaggy silt loam. In some areas bedrock is within a depth of 60 inches.

Included with this soil in mapping are small areas of limestone escarpments. The escarpments are above the Lacrescent soil. Included areas make up less than 5 percent of the map unit.

Water and air move through the Lacrescent soil at a moderate or moderately rapid rate. Surface runoff is very rapid. Available water capacity is moderate. Organic matter content is high. The shrink-swell potential is low, and the potential for frost action is moderate.

In most areas this soil supports stands of native trees and herbaceous plants. It is generally unsuited to cultivated crops, pasture, hay, and commercial timber production because of the slope. It is moderately suited to use as habitat for woodland wildlife.

If this soil is used as habitat for wildlife, excluding livestock helps to protect the shrubs and sprouts that provide food and cover for woodland wildlife, such as deer, turkeys, squirrels, and a variety of songbirds. Planting hedges and rows of shrubs provides cover for doves and many songbirds.

The land capability classification is VIIe.

864—Pits, quarries. This map unit consists of areas from which the soil and underlying rock have been excavated. Depth of excavations generally ranges from about 20 to more than 100 feet. Slopes range from nearly level on the floor to almost vertical on the walls. Individual areas are irregular in shape and range from 3 to 20 acres.

The original soils have been destroyed, altered, or obscured to such a degree that identifying and classifying them was not possible or practical.

Included with this unit in mapping are small undisturbed areas of Goss, Lacrescent, and Seaton soils. In some areas the pits contain water. Included areas make up less than 5 percent of the map unit.

Most quarries are active. Limestone is mined for use in agriculture and in construction.

This map unit is not assigned a land capability classification.

1070—Beaucoup silty clay loam, wet. This nearly level, very poorly drained soil is on flood plains. In most years it is subject to frequent flooding for brief periods from March to June. It is ponded for long periods throughout the year. Individual areas are irregular in shape and range from 10 to 550 acres.

Typically, the surface layer is black, firm silty clay loam about 12 inches thick. The subsoil is firm silty clay loam about 23 inches thick. The upper part is dark gray. The lower part is dark grayish brown and mottled. The underlying material to a depth of 60 inches or more is dark grayish brown, firm silty clay loam. In some areas the surface layer is not as dark. In other areas the seasonal high water table is more than 2 feet below the surface.

Included with this soil in mapping are small areas of very poorly drained Booker soils. These soils have more clay throughout, are not subject to flooding, and are on terraces above the Beaucoup soil. Also included are shallow water areas. Included areas make up 5 to 10 percent of the map unit.

Water and air move through the Beaucoup soil at a moderately slow rate. Surface runoff is very slow or ponded. In spring the seasonal high water table is 0.5 foot above the surface to 2 feet below. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used as habitat for wetland wildlife. It is well suited to use as habitat for wetland wildlife. It is moderately suited to use as woodland.

If this soil is used as woodland, the equipment limitation, seedling mortality, and the windthrow hazard are management concerns. They are caused by the seasonal high water table. Plant competition adversely affects the seedlings of desirable species. Use of machinery is limited to periods when the soil is firm enough to support its weight. Planting on ridges, selecting planting stock that is older and larger than is typical, and mulching help to reduce seedling mortality. Some replanting may be needed. Harvesting methods that do not isolate the remaining trees or leave them widely spaced help to reduce windthrow. Only high-value trees should be removed from a strip 50 feet wide along the west and south edges of woodland. The plant competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent the destruction of leaf mulch and of desirable young trees, surface compaction, and damage to tree roots. Fire protection measures are needed.

Areas of this soil provide good habitat for wetland wildlife. They are in the Illinois and Mississippi River Valleys. Shallow water areas generally are available, and others can easily be developed. Also available are grain and seed crops, wild herbaceous plants, wetland plants, and other important habitat elements.

The land capability classification is Vw.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It may be cultivated land, pasture, woodland, or other land, but it is not urban and built-up land or water areas. It either is used for food or fiber crops or is available for those crops. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained high yield of crops in an economic manner. Prime farmland produces the highest yields with minimal inputs of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Soil Conservation Service.

About 43,300 acres in the county, or about 24 percent of the total acreage, meets the soil requirements for prime farmland. Scattered areas of this land are throughout the county, but most are in associations 2 and 3, which are described under the heading "General Soil Map Units." About 36,000 acres of this prime farmland is used for crops.

The map units in the survey area that are considered prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Some soils that have a seasonal high water table and all soils that are frequently flooded during the growing season qualify for prime farmland only in areas where these limitations have been overcome by drainage measures or flood control. The need for these measures is indicated after the map unit name in table 5. Onsite evaluation is needed to determine whether or not these limitations have been overcome by corrective measures. In Calhoun County most of the naturally wet soils have been adequately drained.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

In 1974, about 44,000 acres in Calhoun County was used for cultivated crops, 20,000 acres for pasture and hay, and 1,300 acres for orchards *(4)*. The acreage of wheat and grain sorghum has increased in recent years. Also, in recent years the acreage used for sunflower production has increased.

The potential of the soils in Calhoun County for increased production of food and fiber is poor. Most of the land that is presently not tilled is very susceptible to erosion. Food production could be increased by extending the latest crop production technology to all cropland in the county. This soil survey can greatly facilitate the application of such technology. It can also be used to locate prime farmland.

Soil erosion is the major problem on about 70 percent of the cropland and pasture in Calhoun County. Where the slope is more than 2 percent, water erosion is a hazard. Fayette, Seaton, and Sylvan soils are the major soils that are used for crops and pasture and that are susceptible to water erosion.

Loss of the surface layer through water erosion is damaging for two reasons. First, productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Erosion also reduces productivity on soils that are already severely eroded, such as Sylvan soils. Second, soil erosion on farmland results in sediment entering streams. Control of erosion minimizes the pollution of streams by sediment and improves the quality of water available for municipal

best copy available

use, for recreation, and for fish and wildlife.

In many sloping areas, preparing a good seedbed and tilling are difficult because part of the original friable surface layer has been removed by erosion and tillage has mixed the rest with the upper part of the subsoil. Eroded Fayette, Seaton, and Sylvan soils are examples.

Erosion-control practices include providing a protective surface cover, reducing runoff, and increasing infiltration. Using a cropping system that keeps a plant cover on the soil for extended periods helps to control soil erosion and to preserve the productivity of the soil. On livestock farms, which require pasture and hay, including legume and grass forage crops in the cropping system helps to control erosion on sloping land, to provide nitrogen for the following crop, and to improve soil tilth.

Terraces, contour farming, a conservation tillage system, crop residue management, and crop rotations are effective, alone or in combinations, in controlling water erosion on most soils used for farmland in Calhoun County. Since 1980 the use of conservation tillage systems has increased in the county.

Information on the design of erosion-control practices for each kind of soil is contained in the Field Office Technical Guide. This information is available in local offices of the Soil Conservation Service.

Soil blowing is a hazard on the sandy Oakville soils. Maintaining a plant cover, a surface mulch, or a rough surface through proper tillage helps to reduce soil blowing.

Soil tilth is important in seedbed preparation and for seed germination. It also affects the rate of water infiltration. Some soils used for crops in the survey area have a silt loam surface layer that is low in organic matter. Generally, the structure of such soils is weak, and intensive rainfall causes a crust to form on the surface. The crust is hard when dry and is nearly impervious to water. Once the crust forms, it reduces infiltration and increases runoff. Regular additions of crop residue, manure, and other organic material help to improve soil structure and to reduce crust formation. Leaving crop residue on the surface also helps to prevent the formation of a crust.

Booker and Okaw soils also have poor soil tilth. These soils are high in clay content in the surface layer and generally remain wet until late in the spring. If they are wet when tilled, they tend to be very cloddy when dry, and seedbed preparation is difficult. Doing the primary tillage in the fall helps to prevent cloddy conditions in spring.

Soil drainage is needed on about 35 percent of the acreage used for cultivated crops and pasture in the survey area. Some soils are so naturally wet that production of crops is generally not possible without artificial drainage. Very poorly drained Booker soils and poorly drained Beaucoup and Okaw soils are examples. Because of the moderately slow or very slow permeability and the lack of suitable outlets, these soils are generally unsuited to subsurface drainage.

Information on drainage design is contained in the Field Office Technical Guide available in local offices of the Soil Conservation Service or the Cooperative Extension Service.

Levees provide flood protection on some of the soils in the county. Unprotected areas are subject to frequent or occasional flooding. In many of these areas levees are not feasible. Planting crops and varieties that can withstand a shorter growing season and switching to a less intensive use, such as pasture, hay, or woodland, are alternatives.

Most of the light colored upland soils are naturally acid and require periodic applications of lime to maintain high yields. The dark colored bottom land soils become acid because of farming operations and, therefore, require periodic applications of lime. Crops generally respond well to additions of lime and fertilizer. Wheat and legume hay crops respond especially well to applications of phosphorus. On all soils the applications of lime and fertilizer should be based on soil tests, the needs of the individual crop, and the expected yield. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to apply.

Field crops suited to the soils and climate of the survey area include many that are not commonly grown. Corn and soybeans are the major cultivated row crops. Wheat is the most commonly grown small grain crop. Forage crops include orchardgrass, smooth bromegrass, tall fescue, alfalfa, alsike clover, and red clover. Sunflowers are being grown in a few areas in the county.

Orchards, vineyards, and nursery plants are suited to most well drained and moderately well drained soils in the survey area (fig. 7). Early vegetables, small fruits, and orchards generally are poorly suited to soils in low positions where air drainage is poor and frost damage is frequent.

The latest information and suggestions for growing crops can be obtained from local offices of the Cooperative Extension Service and the Soil Conservation Service.

Yields Per Acre

The average yields per acre that can be expected of

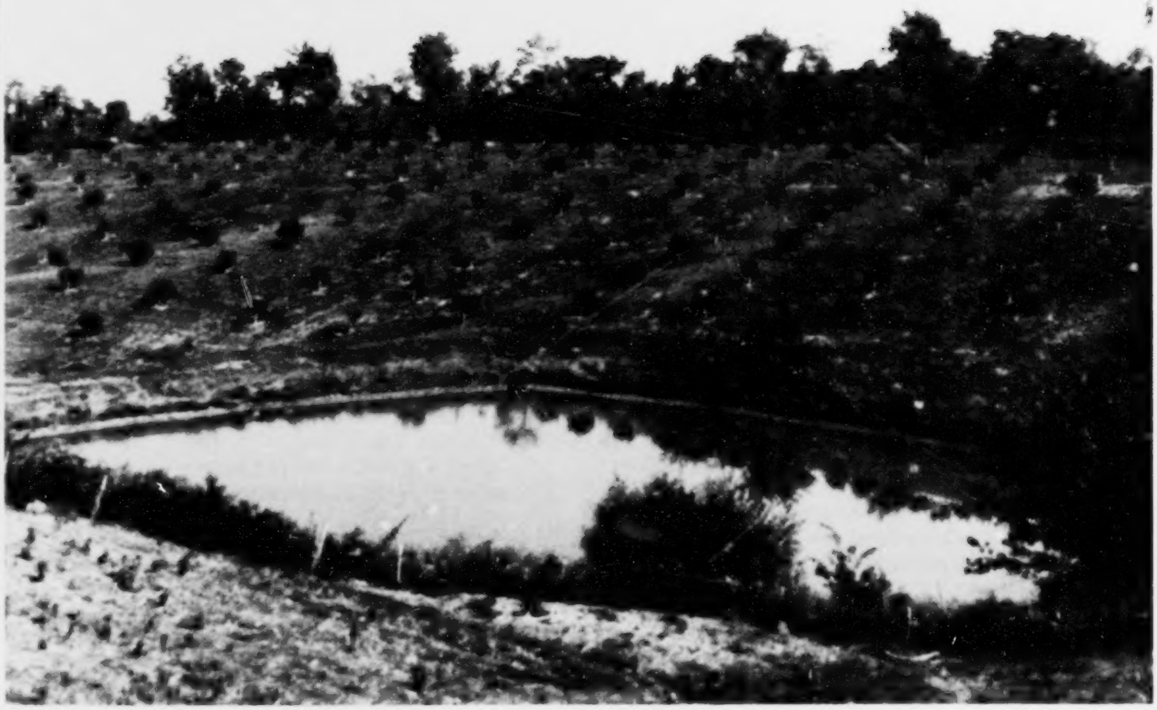


Figure 7.—Many areas of sloping soils in Calhoun County are well suited to use as orchards. This young orchard is in an area of Fayette silt loam, 10 to 18 percent slopes, eroded.

the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered *(3)*.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit *(9)*. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e*, *w*, *s*, or *c* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w*, *s*, or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in the yields table.

Woodland Management and Productivity

Tom Wilson, district forester, Illinois Department of Conservation, helped prepare this section.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume in cubic meters per hectare per year, which the indicator species can produce. The number 1 indicates low potential productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 through 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *R* indicates steep slopes; *X*, stoniness or rockiness; *W*, excessive water in or on the soil; *T*, toxic substances in the soil; *D*, restricted rooting depth; *C*, clay in the upper part of the soil; *S*, sandy texture; and *F*, high content of rock fragments in the soil. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, and F.

In table 7, *slight*, *moderate*, and *severe* indicate the degree of the major soil limitation to be considered in management.

Erosion hazard is the probability that damage will occur as a result of site preparation and following cutting where the soil is exposed along roads, skid trails, fire lanes, and log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment or season of use is not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of *slight* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of *moderate* indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *severe* indicates that many trees can be blown down during these periods.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *volume* number. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *volume*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic feet per acre per year, indicates the amount of fiber produced on a fully stocked, even-aged, unmanaged stand.

The first species listed under *common trees* for a soil is the indicator species for that soil. It is the dominant species on the soil and the one that determines the ordination class.

Trees to plant are those that are suitable for commercial wood production.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, help to keep snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 8 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 8 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Soil Conservation Service or the Cooperative Extension Service or from a commercial nursery.

Recreation

Calhoun County has many areas of scenic and historic interest. These areas are used for hiking, camping, hunting, fishing, sightseeing, picnicking, and boating. There are several river access areas available for public use. Several sportsmen's clubs provide facilities for hiking, hunting, fishing, and boating. The Mississippi and Illinois Rivers provide opportunities for fishing, hunting, boating, and water-skiing.

The potential for further recreational development is very favorable throughout the county. The hilly terrain, wooded side slopes, and numerous creeks and streams provide opportunities for a variety of recreational uses.

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

William Lorenzen, district conservationist, Soil Conservation Service, helped prepare this section.

Areas used as wildlife habitat are not necessarily set aside for this purpose. Wildlife habitat is commonly a secondary use in areas used for other purposes, such as pasture or woodland. For example, the many wooded slopes in Calhoun County generally are well suited to use as habitat for woodland wildlife. The major wildlife species in the survey area include rabbit, squirrel, deer, turkey, raccoon, quail, red fox, coyote, and migratory waterfowl. The Illinois and Mississippi Rivers are rich in both sport and commercial fishing. Common game fish include bass, bluegill, catfish, sauger, and walleye. Common commercial fish are carp, buffalo, drum, and suckers. Wetlands adjacent to the rivers provide resting and feeding areas for migrating ducks and geese.

Good management can improve habitat for wildlife. In cultivated areas keeping crop residue on the surface during fall and winter not only helps to control erosion, but also provides habitat for wildlife. Deferred mowing of grassed waterways, roadsides, and fence rows until early August, after the nesting season, significantly increases the annual production of songbirds, quail, rabbits, and other kinds of wildlife that nest in those areas. Excluding livestock from the woodland, wetlands, and streambanks markedly improves the habitat.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, and sunflowers.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, and wheatgrass.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, pecan, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and pawpaw. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian olive, autumn olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, cattail, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl-feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, thrushes, woodpeckers, squirrels, red fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

In the following paragraphs the associations in Calhoun County, which are described under the heading "General Soil Map Units," are grouped into two wildlife areas.

Wildlife Area 1 is in areas of the Seaton-Goss and Fayette-Sylvan-Rozetta associations. Slopes in this area are gently sloping to very steep. This area is used as woodland, cropland, and pasture and provides habitat for a variety of wildlife. Habitat for wildlife generally is very good, especially in the areas of woodland. Habitat can be improved by managing pastured areas properly, excluding livestock from the wooded areas, planting trees and shrubs that bear fruit and nuts, leaving crop residue on the surface after harvest, establishing food plots of grain crops, and not mowing the grassy cover until after the nesting season.

Wildlife Area 2 is in areas of the Booker-Okaw and Beaucoup-Tice associations. Slopes in this wildlife area are nearly level. This area is on flood plains and terraces near the Illinois and Mississippi Rivers. It is used as cropland and woodland. Habitat for wildlife generally is good. The area is inhabited by both upland and wetland wildlife. Habitat for wetland wildlife can be improved by establishing or preserving areas of open water, increasing the capacity of ditches, pits, and levees to retain water, and planting millet, buckwheat, sorghum, corn, and other crops that provide food for waterfowl.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of absorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 12 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during the wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement, permeability, depth to a high water table or depth of standing water if the soil is subject to ponding, slope, susceptibility to flooding, subsidence of organic layers, and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 18.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 18.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at [illegible] bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to soil blowing. Soils are grouped according to the following distinctions:

1. Sands, coarse sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy sands, loamy fine sands, and loamy very fine sands. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

3. Sandy loams, coarse sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous loamy soils that are less than 35 percent clay and more than 5 percent finely divided calcium carbonate. These soils are erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.

5. Loamy soils that are less than 20 percent clay and less than 5 percent finely divided calcium carbonate and sandy clay loams and sandy clays that are less than 5 percent finely divided calcium carbonate. These soils are slightly erodible. Crops can be grown if measures to control soil blowing are used.

6. Loamy soils that are 20 to 35 percent clay and less than 5 percent finely divided calcium carbonate, except silty clay loams. These soils are very slightly erodible. Crops can easily be grown.

7. Silty clay loams that are less than 35 percent clay and less than 5 percent finely divided calcium carbonate. These soils are very slightly erodible. Crops can easily be grown.

8. Stony or gravelly soils and other soils not subject to soil blowing.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two hydrologic groups in table 17, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary inundation of an area, is caused by overflowing streams or by runoff from adjacent slopes. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs, on the average, once or less in 2 years; and *frequent* that is occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 17 are the depth to the seasonal high water table, the kind of water table—that is, perched or apparent, and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Engineering Index Test Data

Table 18 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are representative of the series described in the section "Soil Series and Their Morphology." The soil samples were tested by the Illinois Department of Transportation.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 424 (ASTM); and Moisture density, Method A—T 99 (AASHTO), D 698 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(10)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 19 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Alfisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udalf (*Ud*, meaning humid, plus *alf*, from Alfisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludalfs (*Hapl*, meaning minimal horizonation, plus *udalf*, the suborder of the Alfisols that has a humid climate.)

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludalfs.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-silty, mixed, mesic Typic Hapludalfs.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the underlying material can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (8)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (10)*. Unless otherwise stated, matrix colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Beaucoup Series

The Beaucoup series consists of poorly drained and very poorly drained, moderately slowly permeable soils on flood plains. These soils formed in alluvium. Slopes range from 0 to 2 percent.

Beaucoup soils are similar to Tice soils and commonly are adjacent to Booker and Tice soils. Booker soils are very poorly drained, have more clay throughout, and are on terraces along areas of the Beaucoup soils. Tice soils are somewhat poorly drained and are in positions slightly higher than those of the Beaucoup soils.

Typical pedon of Beaucoup silty clay loam, 2,800 feet north and 2,700 feet east of the southwest corner of sec. 11, T. 13 S., R. 1 W.

A—0 to 12 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; moderate medium subangular blocky structure; firm; few fine roots; few fine dark brown (7.5YR 4/4) iron stains; neutral; clear smooth boundary.

Bg1—12 to 23 inches; very dark gray (N 3/0) silty clay loam, dark gray (10YR 4/1) dry; moderate medium angular blocky structure; firm; very few fine roots; few fine dark brown (7.5YR 4/4) iron stains; neutral; clear smooth boundary.

Bg2—23 to 33 inches; dark gray (5Y 4/1) silty clay loam; common medium prominent dark yellowish brown (10YR 4/6) mottles; moderate medium subangular blocky structure; firm; very few fine roots; common fine dark brown (7.5YR 4/4) iron stains; mildly alkaline; gradual smooth boundary.

BCg—33 to 48 inches; dark gray (5Y 4/1) stratified fine sandy loam, loam, silt loam, and silty clay loam; common medium prominent dark bluish gray (5B 4/1) mottles; weak medium subangular blocky structure; friable; very few fine roots; common fine dark brown (7.5YR 4/4) iron stains; neutral; gradual smooth boundary.

Cg—48 to 60 inches; dark gray (N 4/0) silty clay loam; common medium prominent dark yellowish brown (10YR 4/4) mottles; massive; friable; few fine dark brown (7.5YR 4/4) iron stains; slightly acid.

The solum ranges from 45 to more than 60 inches in thickness. The control section is medium acid to mildly alkaline.

The A or Ap horizon has value of 2 or 3 and chroma of 1 or 2. The Bg horizon has hue of 10YR or 5Y or is neutral. It has value of 3 or 4 and chroma of 1 or 0. The Cg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral. It has chroma of 0 to 2. Some pedons are not stratified within a depth of 60 inches.

Booker Series

The Booker series consists of very poorly drained, very slowly permeable soils on terraces. These soils formed in clayey lacustrine sediments. Slopes range from 0 to 2 percent.

Booker soils commonly are adjacent to Beaucoup and Okaw soils. Beaucoup soils have less clay in the control section and are on flood plains below the Booker soils. Okaw soils have a light colored surface layer and are in positions similar to those of the Booker soils.

Typical pedon of Booker clay, 900 feet west and 920 feet north of the southeast corner of sec. 23, T. 11 S., R. 2 W.

Ap—0 to 9 inches; very dark gray (N 3/0) clay, dark gray (5Y 4/1) dry; strong coarse granular and moderate fine angular blocky structure; firm; few fine roots; neutral; clear smooth boundary.

Bw1—9 to 25 inches; very dark gray (5Y 3/1) clay, gray (5Y 5/1) dry; few coarse faint olive gray (5Y 5/2) mottles; moderate medium angular blocky structure parting to moderate fine angular blocky; firm; few fine roots; neutral; clear smooth boundary.

Bw2—25 to 38 inches; very dark gray (5Y 3/1) clay, gray (5Y 5/1) dry; common coarse faint olive gray (5Y 5/2) mottles; moderate medium angular blocky structure parting to moderate fine angular blocky; very firm; few fine roots; common fine white (10YR 8/1) snail shell fragments and lime concretions (calcium carbonates); mildly alkaline; gradual smooth boundary.

Bg—38 to 60 inches; dark gray (5Y 4/1) clay; common coarse faint olive gray (5Y 5/2) mottles; moderate medium angular blocky structure; few slickensides; extremely firm; few very fine roots; white (10YR 8/1) snail shell fragments and lime concretions (calcium carbonates); mildly alkaline.

The solum ranges from 50 to more than 60 inches in thickness. The control section is neutral or mildly alkaline.

The Ap horizon has hue of 5Y or is neutral. It has value of 2 or 3 and chroma of 2 or less. The Bw and Bg horizons have hue of 5Y or are neutral. They have value of 3 or 4 and chroma of 2 or less.

Drury Series

The Drury series consists of well drained, moderately permeable soils on foot slopes and alluvial fans. These soils formed in silty local alluvium. Slopes range from 2 to 10 percent.

These soils have a weak argillic horizon and less clay in the subsoil than is definitive for the Drury series. These differences, however, do not significantly affect the use or behavior of the soils.

Drury soils are similar to Raddle soils and commonly are adjacent to Haymond and Seaton soils. Haymond soils are subject to flooding and are in lower positions than those of the Drury soils. Raddle soils have a dark colored surface layer. Seaton soils have more clay in the subsoil and are on side slopes above the Drury soils.

Typical pedon of Drury silt, 2 to 5 percent slopes, 950 feet south and 800 feet west of the northeast corner of sec. 10, T. 9 S., R. 3 W.

Ap—0 to 5 inches; dark brown (10YR 3/3) silt, brown (10YR 5/3) dry; moderate medium granular structure; friable; slightly acid; abrupt smooth boundary.

A—5 to 14 inches; brown (10YR 4/3) silt; moderate medium subangular blocky structure; friable; slightly acid; clear smooth boundary.

E—14 to 17 inches; brown (10YR 4/3) silt; moderate medium subangular blocky and weak thin platy structure; friable; few distinct light brownish gray (10YR 6/2) dry, silt coatings on faces of peds; slightly acid; gradual smooth boundary.

Bt—17 to 30 inches; dark yellowish brown (10YR 4/4) silt loam; moderate coarse subangular blocky structure; friable; few distinct white (10YR 8/1) dry, silt coatings in krotovinas; slightly acid; gradual smooth boundary.

BC—30 to 41 inches; dark yellowish brown (10YR 4/4) silt loam; weak coarse subangular blocky structure; friable; few distinct white (10YR 8/1) dry, silt coatings in krotovinas; medium acid; gradual smooth boundary.

C—41 to 60 inches; dark yellowish brown (10YR 4/4) silt loam; massive; friable; few distinct white (10YR 8/1) dry, silt coatings in krotovinas; medium acid.

The solum ranges from 37 to 60 inches in thickness. The control section is medium acid to neutral.

The Ap or A horizon has value of 3 or 4. It is silt or silt loam. The Bt horizon has chroma of 3 or 4.

Fayette Series

The Fayette series consists of well drained, moderately permeable soils on uplands. These soils formed in loess. Slopes range from 1 to 18 percent.

Fayette soils are similar to Rozetta, Seaton, and Sylvan soils and commonly are adjacent to Seaton and Sylvan soils. Rozetta soils are moderately well drained. Seaton and Sylvan soils are in positions similar to those of the Fayette soils. Seaton soils have less clay in the control section. Sylvan soils have carbonates within a depth of 40 inches.

Typical pedon of Fayette silt loam, 1 to 5 percent slopes, 2,900 feet south and 1,500 feet east of the northwest corner of sec. 4, T. 8 S., R. 3 W.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

E—7 to 14 inches; brown (10YR 4/3) silt loam; weak thin platy structure; friable; common fine roots; neutral; abrupt smooth boundary.

BE—14 to 20 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium subangular blocky structure; friable; few fine roots; medium acid; clear smooth boundary.

Bt1—20 to 28 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; few fine roots; few distinct brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—28 to 39 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; common distinct brown (10YR 4/3) clay films and few distinct light yellowish brown (10YR 6/4) dry, silt coatings on faces of peds; strongly acid; clear smooth boundary.

BC—39 to 48 inches; dark yellowish brown (10YR 4/4) silt loam; weak coarse subangular blocky structure; firm; few fine roots; few distinct light yellowish brown (10YR 6/4) dry, silt coatings on faces of peds; strongly acid; gradual smooth boundary.

C—48 to 60 inches; dark yellowish brown (10YR 4/4) silt loam; massive; strongly acid.

The solum ranges from 48 to more than 60 inches in thickness. The control section is very strongly acid to medium acid. Depth to carbonates is more than 40 inches.

The Ap horizon has value of 3 or 4 and chroma of 2 or 3. The Bt horizon has value of 4 or 5 and chroma of 4 to 6. The C horizon has both value and chroma of 4 to 6.

Goss Series

The Goss series consists of well drained soils on uplands. These soils are moderately rapidly permeable in the upper part of the profile and moderately permeable in the lower part. They formed in a thin mantle of loess over residuum weathered from limestone. Slopes range from 15 to 70 percent.

Goss soils commonly are adjacent to Haymond and Seaton soils. Haymond soils are on flood plains below the Goss soils. Seaton soils contain less clay throughout and are in positions similar to those of the Goss soils.

Typical pedon of Goss cherty silt loam, 30 to 70 percent slopes, 60 feet west and 610 feet north of the southeast corner of sec. 21, T. 10 S., R. 2 W.

A—0 to 2 inches; very dark grayish brown (10YR 3/2) cherty silt loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; many medium roots; about 20 percent chert; strongly acid; abrupt smooth boundary.

E1—2 to 6 inches; brown (10YR 5/3) cherty silt loam; weak thin platy structure; friable; few medium roots; about 20 percent chert; very strongly acid; clear smooth boundary.

E2—6 to 10 inches; brown (10YR 5/3 and 7.5YR 5/4) cherty silt loam; weak thin platy structure; friable; few medium roots; about 20 percent chert; very strongly acid; clear smooth boundary.

BE—10 to 16 inches; strong brown (7.5YR 5/6) cherty silt loam; strong medium subangular blocky structure; firm; few medium roots; about 20 percent chert; very strongly acid; gradual smooth boundary.

2Bt1—16 to 23 inches; yellowish red (5YR 5/6) very cherty silty clay loam; strong medium subangular blocky structure; firm; few fine roots; few distinct reddish brown (5YR 4/4) clay films on faces of peds; about 60 percent chert; very strongly acid; gradual smooth boundary.

2Bt2—23 to 35 inches; yellowish red (5YR 5/6) very cherty silty clay; strong medium angular blocky structure; firm; few medium roots; few distinct red (2.5YR 4/8) clay films on faces of peds; about 60 percent chert; very strongly acid; clear smooth boundary.

2Bt3—35 to 60 inches; yellowish red (5YR 5/6) cherty silty clay; weak coarse angular blocky structure; very firm; few medium and coarse roots; few distinct red (2.5YR 4/8) clay films on faces of peds; about 40 percent chert; very strongly acid.

The solum is more than 60 inches thick. The loess ranges from 4 to 18 inches in thickness.

The A horizon has value of 2 or 3 and chroma of 1 to 3. It is silt loam or cherty silt loam. The E horizon has hue of 7.5YR or 10YR and chroma of 3 or 4. The 2Bt horizon has hue of 7.5YR or 5YR and chroma of 4 to 6. It is very cherty silty clay loam, cherty silty clay, or very cherty silty clay.

Hamburg Series

The Hamburg series consists of somewhat excessively drained, moderately permeable, calcareous soils on uplands. These soils formed in loess. Slopes range from 30 to 65 percent.

Hamburg soils commonly are adjacent to Seaton and Sylvan soils. Seaton and Sylvan soils are well drained and have more acid in the upper part of the profile. Seaton soils are in positions similar to those of the Hamburg soils. Sylvan soils are in less sloping areas above the Hamburg soils.

Typical pedon of Hamburg silt loam, 30 to 65 percent slopes, 1,460 feet west and 1,820 feet south of the northeast corner of sec. 2, T. 8 S., R. 3 W.

A—0 to 3 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; few fine roots; slight effervescence; mildly alkaline; clear smooth boundary.

AC—3 to 9 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak fine granular structure; friable; few fine roots; strong effervescence; moderately alkaline; gradual smooth boundary.

C1—9 to 13 inches; dark yellowish brown (10YR 4/4) silt loam; weak very fine granular structure; friable; very few fine roots; violent effervescence; moderately alkaline; gradual smooth boundary.

C2—13 to 40 inches; yellowish brown (10YR 5/4) silt loam; massive; friable; very few very fine roots; violent effervescence; moderately alkaline; gradual smooth boundary.

C3—40 to 60 inches; light yellowish brown (10YR 6/4) silt loam; massive; friable; very few very fine roots; violent effervescence; moderately alkaline.

The solum ranges from 3 to 20 inches in thickness. The control section is mildly alkaline or moderately alkaline. The A horizon has value of 3 or 4 and chroma of 2 or 3. It is silt or silt loam. The C horizon has chroma of 3 or 4.

Haymond Series

The Haymond series consists of well drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Haymond soils commonly are adjacent to Drury and Wakeland soils. Drury soils are not subject to flooding and are in higher positions than those of the Haymond soils. Wakeland soils are somewhat poorly drained and in positions similar to those of the Haymond soils.

Typical pedon of Haymond silt, 1,740 feet east and 1,180 feet north of the southwest corner of sec. 27, T. 8 S., R. 3 W.

Ap—0 to 8 inches; brown (10YR 4/3) silt, pale brown (10YR 6/3) dry; weak fine granular structure; friable; few fine roots; medium acid; abrupt smooth boundary.

Bw1—8 to 18 inches; brown (10YR 4/3) silt loam; moderate medium subangular blocky structure; friable; few fine roots; slightly acid; clear smooth boundary.

Bw2—18 to 35 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium subangular blocky structure; friable; few fine roots; few distinct brown (10YR 5/3) silt coatings on faces of peds; slightly acid; gradual smooth boundary.

C—35 to 60 inches; dark yellowish brown (10YR 4/4) silt loam; massive; friable; medium acid.

The solum ranges from 35 to 60 inches in thickness. The control section is medium acid to neutral.

The Ap horizon has chroma of 2 or 3. It is silt or silt loam. The Bw horizon has value of 4 or 5. The C horizon has value of 4 or 5 and chroma of 3 or 4.

Hurst Series

The Hurst series consists of somewhat poorly drained soils on terraces. These soils are moderately slowly permeable in the upper part of the profile and very slowly permeable in the lower part. They formed in loess and lacustrine deposits. Slopes range from 0 to 2 percent.

Hurst soils commonly are adjacent to Oakville and Okaw soils. Oakville soils are well drained, have more sand and less clay throughout, and are in slightly higher positions than those of the Hurst soils. Okaw soils are poorly drained and in lower positions than those of the Hurst soils.

Typical pedon of Hurst silt loam, 2,080 feet south and 525 feet east of the northwest corner of sec. 16, T. 13 S., R. 1 W.

Ap—0 to 8 inches; grayish brown (10YR 5/2) silt loam, light gray (10YR 7/2) dry; weak medium granular structure; friable; common fine roots; few fine and medium concretions (iron and manganese oxides); slightly acid; clear smooth boundary.

E—8 to 14 inches; grayish brown (10YR 5/2) silt loam; weak thin platy structure; friable; few fine roots; few fine and medium concretions (iron and manganese oxides); medium acid; clear smooth boundary.

2BE—14 to 20 inches; brown (10YR 5/3) silty clay loam; weak medium subangular blocky structure; firm; few fine roots; strongly acid; clear smooth boundary.

2Bt1—20 to 26 inches; brown (10YR 5/3) silty clay; moderate medium angular blocky structure; firm; few fine roots; common distinct grayish brown (10YR 5/2) clay films on faces of peds; very strongly acid; clear smooth boundary.

2Bt2—26 to 32 inches; brown (10YR 5/3) silty clay; few fine prominent yellowish red (5YR 5/8) mottles; moderate medium angular and subangular blocky structure; firm; very few fine roots; few distinct grayish brown (10YR 5/2) clay films on faces of peds; very strongly acid; clear smooth boundary.

3BC—32 to 43 inches; dark grayish brown (10YR 4/2) clay loam; common medium prominent yellowish red (5YR 5/8) mottles; weak coarse subangular blocky structure; friable; very few fine roots; few distinct very dark gray (10YR 3/1) organic films lining pores; very strongly acid; gradual smooth boundary.

3C—43 to 60 inches; dark grayish brown (10YR 4/2) sandy clay loam; many medium prominent yellowish red (5YR 5/8) mottles; massive; friable; strongly acid.

The solum ranges from 40 to 45 inches in thickness. The control section is extremely acid to neutral.

The Ap and E horizons have value of 4 or 5 and chroma of 2 or 3. The 2Bt horizon also has value of 4 or 5 and chroma of 2 or 3. It is silty clay loam or silty clay. The 3BC horizon is silty clay loam, silt loam, or clay loam. The 3C horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 6. It is clay loam, sandy clay loam, or silty clay, and in some pedons it is stratified.

Lacrescent Series

The Lacrescent series consists of well drained soils at the base of limestone bluffs. These soils are moderately permeable in the upper part and moderately rapidly permeable in the lower part. They formed in a mixture of calcareous loess and talus of limestone flagstones. Slopes range from 30 to 70 percent.

Lacrescent soils commonly are adjacent to Hamburg and Raddle soils. Hamburg soils are somewhat excessively drained, formed in loess, and are in higher positions than those of the Lacrescent soils. Raddle soils formed from alluvium and are in positions below the Lacrescent soils.

Typical pedon of Lacrescent very flaggy silt loam, 30 to 70 percent slopes, 1,440 feet south and 2,400 feet east of the northwest corner of sec. 22, T. 8 S., R. 2 W.

A—0 to 9 inches; very dark brown (10YR 2/2) very flaggy silt loam, very dark grayish brown (10YR 3/2) dry; moderate coarse granular structure; friable; common fine roots; about 40 percent flagstones and pebbles; strong effervescence; mildly alkaline; clear smooth boundary.

AB—9 to 18 inches; dark brown (10YR 3/3) very flaggy silt loam, brown (10YR 5/3) dry; moderate medium granular structure; friable; common medium roots; about 40 percent flagstones and pebbles; violent effervescence; mildly alkaline; clear smooth boundary.

Bw—18 to 36 inches; brown (7.5YR 4/4) extremely flaggy silty clay loam; moderate medium granular structure; friable; few fine roots; about 65 percent flagstones and pebbles; violent effervescence; mildly alkaline; gradual smooth boundary.

C—36 to 60 inches; dark brown (7.5YR 3/4) very flaggy silt loam; massive; friable; about 50 percent flagstones and pebbles; violent effervescence; mildly alkaline.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is very cobbly or very flaggy silt loam. It is neutral or mildly alkaline. The C horizon has hue of 10YR, 7.5YR, or 5YR, value of 2 or 3, and chroma of 1 to 4. It is very cobbly or very flaggy silt loam.

Oakville Series

The Oakville series consists of well drained soils on terraces. These soils are rapidly permeable in the upper part of the profile and moderately slowly permeable in the lower part. They formed in sandy eolian material. Slopes range from 0 to 15 percent.

Oakville soils commonly are adjacent to Hurst and Tice soils. Hurst and Tice soils are somewhat poorly drained and have more clay throughout. Hurst soils are in positions similar to those of the Oakville soils. Tice soils are on flood plains below the Oakville soils.

Typical pedon of Oakville loamy fine sand, loamy substratum, 0 to 3 percent slopes, 680 feet west and 1,940 feet north of the southeast corner of sec. 16, T. 13 S., R. 1 W.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) loamy fine sand, pale brown (10YR 6/3) dry; weak fine granular and subangular blocky structure; very friable; medium acid; clear smooth boundary.

Bw1—7 to 11 inches; dark brown (10YR 3/3) loamy fine sand, pale brown (10YR 6/3) dry; weak fine prismatic structure parting to weak medium subangular blocky; very friable; slightly acid; abrupt smooth boundary.

Bw2—11 to 22 inches; brown (10YR 4/3) fine sand; weak fine subangular blocky structure; very friable; slightly acid; clear smooth boundary.

Bw3—22 to 26 inches; dark yellowish brown (10YR 4/4) fine sand; weak medium subangular blocky structure; very friable; slightly acid; clear smooth boundary.

BC—26 to 39 inches; yellowish brown (10YR 5/4) fine sand; weak medium subangular blocky structure; very friable; slightly acid; gradual smooth boundary.

C1—39 to 43 inches; brown (10YR 5/3) fine sand; massive; very friable; neutral; abrupt smooth boundary.

2C2—43 to 55 inches; variegated silty clay loam, 70 percent brown (10YR 5/3) and 30 percent dark yellowish brown (10YR 4/4); few fine prominent yellowish red (5YR 5/6) and few fine distinct strong brown (7.5YR 5/6) mottles; massive; friable; slightly acid; gradual smooth boundary.

2C3—55 to 60 inches; dark yellowish brown (10YR 4/4) loam; few medium distinct brown (7.5YR 4/4) and common medium faint pale brown (10YR 6/3) mottles; massive; very friable; slightly acid.

The solum ranges from 18 to 40 inches in thickness. The Ap horizon has value of 3 or 4 and chroma of 1 to 3. It is loamy sand or loamy fine sand. The Bw horizon has value of 3 to 5. It is loamy sand, loamy fine sand, fine sand, or sand. The C horizon has value of 4 or 5 and chroma of 3 to 6. It is sand, loamy sand, or fine sand. The 2C horizon is dominantly silt loam, silty clay loam, or loam. In some pedons, however, it has thin strata of fine sand.

Okaw Series

The Okaw series consists of poorly drained, very slowly permeable soils on terraces. These soils formed in a thin mantle of loess and in the underlying clayey lacustrine material. Slopes range from 0 to 2 percent.

Okaw soils commonly are adjacent to Booker and Wakeland soils. Booker soils are very poorly drained, have a darker surface layer, have more clay throughout, and are in positions similar to those of the Okaw soils. Wakeland soils are somewhat poorly drained, have less clay throughout, and are on flood plains below the Okaw soils.

Typical pedon of Okaw silty clay loam, 1,080 feet west and 280 feet north of the southeast corner of sec. 6, T. 13 S., R. 1 W.

Ap—0 to 5 inches; dark gray (10YR 4/1) silty clay loam, gray (5Y 6/1) dry; moderate coarse granular structure; friable; common medium roots; very strongly acid; abrupt smooth boundary.

Eg—5 to 13 inches; dark gray (10YR 4/1) silty clay loam; moderate medium subangular blocky structure; friable; many distinct light gray (10YR 7/1) silt coatings on faces of peds; common medium roots; strongly acid; abrupt smooth boundary.

Btg1—13 to 22 inches; very dark gray (5Y 3/1) silty clay; weak medium angular blocky structure; firm; few fine roots; few distinct very dark gray (5Y 3/1) clay films on faces of peds; strongly acid; clear smooth boundary.

2Btg2—22 to 32 inches; very dark gray (5Y 3/1) clay; weak medium prismatic structure parting to moderate medium angular blocky; firm; few fine roots; common distinct very dark gray (5Y 3/1) clay films on faces of peds; very strongly acid; clear smooth boundary.

2Btg3—32 to 37 inches; variegated dark gray (5Y 4/1) and olive gray (5Y 5/2) clay; weak medium angular blocky structure; firm; few fine roots; common distinct black (5Y 2.5/1) clay films on faces of peds; medium acid; clear smooth boundary.

2Btg4—37 to 46 inches; variegated olive gray (5Y 4/2), olive (5Y 4/4), and light olive brown (2.5Y 5/4) clay; weak medium angular blocky structure; firm; very few fine roots; common distinct olive gray (5Y 4/2) clay films on faces of peds; slightly acid; gradual smooth boundary.

2Btg5—46 to 52 inches; variegated light olive brown (2.5Y 5/4) and olive (5Y 5/3) clay; weak medium angular blocky structure; firm; very few fine roots; common distinct olive gray (5Y 5/2) clay films on faces of peds; common distinct light gray (5Y 7/1) streaks of calcium carbonate; slight effervescence; mildly alkaline; clear smooth boundary.

2BCg—52 to 60 inches; variegated olive gray (5Y 4/2), light olive brown (2.5Y 5/4), and dark grayish brown (2.5Y 4/2) clay; weak coarse angular blocky structure parting to weak thick platy; firm; common distinct light gray (5Y 7/1) streaks of calcium carbonate; slight effervescence; moderately alkaline.

The solum ranges from 34 to more than 60 inches in thickness. The loess ranges from 20 to 30 inches in thickness. The Ap or A horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 1 or 2. It is silt loam or silty clay loam. The Eg horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2. The Btg and 2Btg horizons have hue of 10YR, 2.5Y, or 5Y or are neutral. They have value of 2 to 5 and chroma of 0 to 4. Some pedons have a Cg horizon that has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4.

Orion Series

The Orion series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Orion soils are similar to Wakeland soils and commonly are adjacent to Haymond and Wakeland soils. Haymond soils are well drained. Wakeland soils are somewhat poorly drained and do not have a dark colored buried soil within a depth of 40 inches. Haymond and Wakeland soils are in positions similar to those of the Orion soils.

Typical pedon of Orion silt loam, 1,440 feet east and 300 feet north of the southwest corner of sec. 1, T. 13 S., R. 2 W.

Ap—0 to 6 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak medium subangular blocky structure; friable; few fine roots; mildly alkaline; clear smooth boundary.

C1—6 to 14 inches; brown (10YR 4/3) silt loam; massive; friable; few iron stains; few fine roots; neutral; clear smooth boundary.

C2—14 to 22 inches; brown (10YR 4/3) silt loam; common medium faint dark grayish brown (10YR 4/2) mottles; massive; friable; neutral; abrupt smooth boundary.

Ab1—22 to 36 inches; very dark gray (10YR 3/1) silt loam; weak coarse subangular blocky structure;

friable; neutral; gradual smooth boundary.

Ab2—36 to 60 inches; very dark gray (10YR 3/1) silt loam; weak coarse subangular blocky structure; friable; few iron stains; neutral.

The depth to the buried soil ranges from 20 to 35 inches. The control section ranges from 10 to 18 percent clay. Reaction is medium acid to mildly alkaline throughout the profile.

The Ap horizon has value of 4 or 5. The C horizon has value of 4 or 5 and chroma of 2 or 3. The Ab horizon has value of 2 or 3 and chroma of 2 or less.

Raddle Series

The Raddle series consists of well drained, moderately permeable soils on toe slopes and alluvial fans. These soils formed in silty alluvium. Slopes range from 1 to 5 percent.

These soils have less clay in the control section than is definitive for the Raddle series. This difference, however, does not significantly affect the use or behavior of the soils.

Raddle soils are similar to Drury soils and commonly are adjacent to Drury and Haymond soils. Drury soils do not have a mollic epipedon and are in higher areas than those of the Raddle soils. Haymond soils do not have a mollic epipedon and are on flood plains below the Raddle soils.

Typical pedon of Raddle silt loam, 1 to 5 percent slopes, 1,500 feet north and 1,700 feet east of the southwest corner of sec. 23, T. 11 S., R. 2 W.

Ap—0 to 7 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate medium granular structure; friable; few fine roots; medium acid; abrupt smooth boundary.

A—7 to 12 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate medium subangular blocky structure; friable; few fine roots; slightly acid; clear smooth boundary.

BA—12 to 18 inches; dark yellowish brown (10YR 3/4) silt loam, yellowish brown (10YR 5/4) dry; moderate medium subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; very few fine roots; slightly acid; clear smooth boundary.

Bw1—18 to 21 inches; dark yellowish brown (10YR 3/4) silt loam; moderate medium subangular blocky structure; friable; very few fine roots; neutral; clear smooth boundary.

Bw2—21 to 33 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; firm; few distinct light gray (10YR 7/2) dry, silt coatings on faces of peds; very few fine roots; medium acid; clear smooth boundary.

Bw3—33 to 50 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium prismatic structure; firm; few distinct light gray (10YR 7/2) dry, silt coatings on faces of peds; very few fine roots; medium acid; gradual smooth boundary.

Bw4—50 to 60 inches; dark yellowish brown (10YR 4/4) silt loam; weak coarse subangular blocky structure; firm; few faint light gray (10YR 7/2) dry, silt coatings on faces of peds; medium acid.

The solum ranges from 45 to 70 inches in thickness. The control section is medium acid to neutral.

The Ap horizon has value of 2 or 3 and chroma of 1 to 3. It is silt loam or silt. The Bw horizon has value of 3 to 5 and chroma of 3 or 4.

Rozetta Series

The Rozetta series consists of moderately well drained, moderately permeable soils on uplands. These soils formed in loess. Slopes range from 4 to 15 percent.

Rozetta soils are similar to Fayette, Seaton, and Sylvan soils and commonly are adjacent to Seaton and Stronghurst soils. Fayette and Seaton soils are well drained and are in positions similar to those of the Rozetta soils. Sylvan soils are well drained and have a thinner solum than the Rozetta soils. Stronghurst soils are somewhat poorly drained and are in less sloping areas above the Rozetta soils.

Typical pedon of Rozetta silt loam, 4 to 10 percent slopes, eroded, 1,140 feet east and 2,840 south of the northwest corner of sec. 3, T. 8 S., R. 3 W.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, dark yellowish brown (10YR 4/6) dry; weak fine subangular blocky structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

Bt1—7 to 23 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; very few fine roots; few distinct yellowish brown (10YR 5/4) clay films on faces of peds; few fine and medium stains and concretions (iron and manganese oxides); medium acid; clear smooth boundary.

Bt2—23 to 35 inches; dark yellowish brown (10YR 4/4) silty clay loam; common medium faint pale brown

(10YR 6/3) mottles; moderate medium subangular blocky structure; firm; few fine roots; few distinct brown (10YR 4/3) clay films on faces of peds; few medium stains and concretions (iron and manganese oxides); medium acid; gradual smooth boundary.

BC—35 to 45 inches; dark yellowish brown (10YR 4/6) silt loam; few medium faint yellowish brown (10YR 5/8) and few medium distinct light brownish gray (10YR 6/2) mottles; weak coarse subangular blocky structure; firm; very few fine roots; few medium stains (iron and manganese oxides); strongly acid; gradual smooth boundary.

C—45 to 60 inches; dark yellowish brown (10YR 4/4) silt loam; common medium faint light brownish gray (10YR 6/2) mottles; massive; friable; few stains (iron and manganese oxides); strongly acid.

The solum ranges from 42 to 60 inches in thickness. The control section is medium acid to very strongly acid.

The Ap horizon has value of 3 or 4 and chroma of 2 to 4. It is silt loam or silty clay loam. It is strongly acid to neutral. The Bt horizon has value of 4 or 5 and chroma of 3 to 6. The C horizon has value of 4 to 6 and chroma of 3 or 4.

Sarpy Series

The Sarpy series consists of excessively drained, rapidly permeable and very rapidly permeable soils on flood plains. These soils formed in sandy alluvium. Slopes range from 0 to 2 percent.

Sarpy soils commonly are adjacent to Beaucoup and Tice soils. Beaucoup soils are poorly drained, and Tice soils are somewhat poorly drained. These two soils have more clay throughout and are in positions similar to or slightly lower than those of the Sarpy soils.

Typical pedon of Sarpy sand, 1,420 feet east and 1,680 feet north of the southwest corner of sec. 14., T. 12 S., R. 1 W.

A—0 to 4 inches; brown (10YR 4/3) sand, pale brown (10YR 6/3) dry; weak medium granular structure; friable; common medium roots; mildly alkaline; clear wavy boundary.

C1—4 to 16 inches; brown (10YR 5/3) sand; single grain; noticeable varves; loose; mildly alkaline; clear wavy boundary.

C2—16 to 60 inches; brown (10YR 5/3) coarse sand; single grain; loose; mildly alkaline.

The A horizon has value of 4 or 5 and chroma of 2 or 3. It is loamy sand or sand. The C horizon has value of 4 or 5 and chroma of 3 or 4.

Seaton Series

The Seaton series consists of well drained, moderately permeable soils on uplands. These soils formed in loess. Slopes range from 2 to 60 percent.

Seaton soils are similar to Fayette, Rozetta, and Sylvan soils and commonly are adjacent to Fayette and Sylvan soils. Fayette and Sylvan soils have more clay in the control section and are in positions similar to those of the Seaton soils. Also, Sylvan soils have carbonates within a depth of 40 inches. Rozetta soils are moderately well drained.

Typical pedon of Seaton silt, 30 to 60 percent slopes, 1,020 feet west and 1,160 feet south of the northeast corner of sec. 17, T. 10 S., R. 2 W.

A—0 to 4 inches; mixed 80 percent very dark grayish brown (10YR 3/2) and 20 percent brown (10YR 5/3) silt, light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; common fine roots; neutral; clear smooth boundary.

E—4 to 8 inches; yellowish brown (10YR 5/4) silt; weak thin platy structure; friable; few fine roots; strongly acid; clear smooth boundary.

BE—8 to 14 inches; yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; friable; few fine roots; strongly acid; clear smooth boundary.

Bt1—14 to 18 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; thin patchy dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine roots; strongly acid; clear smooth boundary.

Bt2—18 to 28 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; thin discontinuous dark yellowish brown (10YR 4/4) clay films on faces of peds; very few fine roots; strongly acid; clear smooth boundary.

Bt3—28 to 39 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium subangular blocky structure; friable; thin patchy dark yellowish brown (10YR 4/4) clay films on faces of peds; neutral; clear smooth boundary.

BC—39 to 48 inches; yellowish brown (10YR 5/4) silt loam; moderate medium angular and subangular blocky structure; friable; mildly alkaline; clear smooth boundary.

C—48 to 60 inches; yellowish brown (10YR 5/4) silt loam; massive; friable; slight effervescence; moderately alkaline.

The solum ranges from 42 to more than 60 inches in thickness. The control section is strongly acid to neutral.

The A horizon has value of 3 to 5 and chroma of 2 to 4. The Bt horizon has chroma of 3 or 4. The C horizon has value of 4 or 5.

Sogn Series

The Sogn series consists of shallow, somewhat excessively drained, moderately permeable soils on uplands. These soils formed in residuum weathered from limestone. Slopes range from 30 to 65 percent.

These soils are in a more humid climate and are on steeper slopes than is definitive for the Sogn series. These differences, however, do not significantly affect the use or behavior of the soils.

Sogn soils commonly are adjacent to Goss and Seaton soils. Goss and Seaton soils are deep and well drained. They are in positions similar to those of the Sogn soils. Goss soils have chert fragments and more clay throughout than the Sogn soils. Seaton soils formed in loess and are on side slopes above the Sogn soils.

Typical pedon of Sogn flaggy silt loam, 30 to 65 percent slopes, 1,970 feet east and 1,320 feet north of the southwest corner of sec. 7, T. 8 S., R. 2 W.

A—0 to 7 inches; very dark brown (10YR 2/2) flaggy silt loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; friable; common fine and medium roots; about 20 percent flagstones; slight effervescence; mildly alkaline; abrupt smooth boundary.

R—7 inches; bedded limestone.

The thickness of the solum, which corresponds to the depth to bedrock, ranges from 5 to 10 inches.

The A horizon has value of 2 or 3 and chroma of 1 to 3. It is flaggy silt loam or loam and is slightly acid to moderately alkaline.

Stronghurst Series

The Stronghurst series consists of somewhat poorly drained, moderately permeable soils on uplands. These soils formed in loess. Slopes range from 0 to 3 percent.

Stronghurst soils commonly are adjacent to Rozetta and Seaton soils. Rozetta soils are moderately well drained, and Seaton soils are well drained. These two soils are on steeper slopes than those of the Stronghurst soils.

Typical pedon of Stronghurst silt loam, 0 to 3 percent slopes, 1,200 feet east and 1,600 feet south of the northwest corner of sec. 3, T. 8 S., R. 3 W.

Ap—0 to 10 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; very few fine roots; neutral; clear smooth boundary.

BE—10 to 19 inches; pale brown (10YR 6/3) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; common prominent light gray (10YR 7/2) dry, silt coatings on faces of peds; few fine and medium black concretions (iron and manganese oxides); strongly acid; clear smooth boundary.

Bt1—19 to 38 inches; pale brown (10YR 6/3) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak fine prismatic structure; firm; common distinct light brownish gray (10YR 6/2) clay films on faces of peds; few fine and medium black concretions (iron and manganese oxides); very strongly acid; gradual smooth boundary.

Bt2—38 to 46 inches; light brownish gray (10YR 6/2) silty clay loam; few medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; common distinct light brownish gray (10YR 6/2) clay films on faces of peds; very few fine black concretions (iron and manganese oxides); strongly acid; gradual smooth boundary.

BC—46 to 60 inches; light brownish gray (10YR 6/2) silty clay loam; few medium distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; firm; few fine black concretions and few medium black stains (iron and manganese oxides) on faces of peds; medium acid.

The solum ranges from 45 to more than 60 inches in thickness. The Ap horizon has value of 4 or 5 and chroma of 2 or 3. The Bt horizon has value of 5 or 6 and chroma of 2 to 4. It is very strongly acid to slightly acid. Some pedons have, within a depth of 60 inches, a C horizon that has value of 5 or 6 and chroma of 2 or 3. It is silt loam or silty clay loam.

Sylvan Series

The Sylvan series consists of well drained, moderately permeable soils on uplands. These soils formed in loess. Slopes range from 10 to 30 percent.

Sylvan soils are similar to Fayette, Rozetta, and Seaton soils and commonly are adjacent to Fayette and Seaton soils. Fayette and Seaton soils are well drained, do not have carbonates within a depth of 40 inches, and are in positions similar to those of the Sylvan soils. Seaton soils have less clay in the subsoil than the Sylvan soils. Rozetta soils are moderately well drained.

Typical pedon of Sylvan silt loam, 10 to 15 percent slopes, eroded, 3,600 feet west and 2,560 feet north of the southeast corner of sec. 22, T. 10 S., R. 2 W.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam, pale brown (10YR 6/3) dry; moderate coarse granular and moderate fine subangular blocky structure; friable; common fine roots; neutral; abrupt smooth boundary.

BE—6 to 10 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium angular blocky structure; firm; few fine roots; neutral; clear smooth boundary.

Bt1—10 to 19 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; few fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—19 to 29 inches; dark yellowish brown (10YR 4/6) silty clay loam; weak coarse subangular blocky structure; firm; very few fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; neutral; gradual smooth boundary.

BC—29 to 35 inches; yellowish brown (10YR 5/6) silt loam; weak coarse subangular blocky structure; friable; very few very fine roots; neutral; clear smooth boundary.

C—35 to 60 inches; yellowish brown (10YR 5/4) silt; common distinct streaks of white (10YR 8/1) carbonates; massive; friable; violent effervescence; moderately alkaline.

The thickness of the solum ranges from 22 to 40 inches and commonly is the same as the depth to carbonates. The control section is medium acid to neutral.

The Ap horizon has chroma of 2 to 4. The Bt horizon has value of 4 or 5 and chroma of 4 to 8. It is silty clay loam or silt loam. The C horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 to 6. It is silt or silt loam.

Tice Series

The Tice series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Tice soils are similar to Beaucoup soils and commonly are adjacent to those soils. Beaucoup soils are poorly drained and slightly lower on the flood plains than the Tice soils.

Typical pedon of Tice silt loam, 240 feet east and 320 feet north of the southwest corner of sec. 20, T. 8 S., R. 3 W.

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure; friable; few fine roots; neutral; clear smooth boundary.

A—6 to 12 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium subangular blocky structure; friable; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine roots; slightly acid; clear smooth boundary.

AB—12 to 17 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine roots; strongly acid; clear smooth boundary.

Bw1—17 to 30 inches; grayish brown (10YR 5/2) silty clay loam; moderate medium prismatic structure parting to moderate medium angular blocky; firm; common distinct brown (10YR 4/3) organic films on faces of peds; few fine yellowish brown (10YR 5/8) iron stains; few fine roots; very strongly acid; clear smooth boundary.

Bw2—30 to 38 inches; brown (10YR 5/3) silty clay loam; few medium distinct yellowish brown (10YR 5/8) mottles; weak coarse angular blocky structure; very firm; common distinct brown (10YR 4/3) organic films on faces of peds; few fine roots; very strongly acid; clear smooth boundary.

BCg—38 to 57 inches; grayish brown (10YR 5/2) silt loam; few medium distinct yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; firm; few distinct dark grayish brown (10YR 4/2) organic films on faces of peds; few fine roots; strongly acid; gradual smooth boundary.

Cg—57 to 60 inches; grayish brown (10YR 5/2) silt loam; few medium distinct yellowish brown (10YR 5/8) mottles; massive; firm; very few fine roots; strongly acid.

The solum ranges from 45 to 57 inches in thickness.

The mollic epipedon ranges from 10 to 20 inches in thickness.

The Ap and A horizons have value of 2 or 3 and chroma of 1 or 2. They are silt loam or silty clay loam. The Bw horizon has value of 4 or 5 and chroma of 1 to 5. It is silty clay loam or silt loam. It is very strongly acid to neutral. The Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. It is commonly silt loam, but in some pedons it is stratified with loam, clay loam, or silty clay loam.

Wakeland Series

The Wakeland series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Wakeland soils are similar to Orion soils and commonly are adjacent to Haymond, Orion, and Seaton soils. Haymond soils are well drained, and Orion soils are somewhat poorly drained. Haymond and Orion soils are in positions similar to those of the Wakeland soils. Orion soils have a dark colored buried soil within a depth of 40 inches. Seaton soils are well drained and on side slopes above the Wakeland soils.

Typical pedon of Wakeland silt loam, 2,000 feet north and 2,100 feet west of the southeast corner of sec. 11, T. 8 S., R. 4 W.

Ap—0 to 9 inches; brown (10YR 4/3) silt loam, brown (10YR 5/3) dry; moderate medium granular structure; friable; few fine roots; medium acid; clear smooth boundary.

Cg1—9 to 29 inches; 60 percent dark grayish brown (10YR 4/2), 30 percent grayish brown (10YR 5/2), and 10 percent light brownish gray (10YR 6/2), stratified silt loam, loam, and very fine sandy loam; common medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; very few fine roots; neutral; gradual smooth boundary.

Cg2—29 to 60 inches; 70 percent dark grayish brown (10YR 4/2), 20 percent grayish brown (10YR 5/2), and 10 percent light brownish gray (10YR 6/2), stratified silt loam, loam, and very fine sandy loam; common brown (7.5YR 4/4) iron stains along stratification planes; massive; friable; neutral.

The Cg horizon has value of 4 to 6 and chroma of 1 to 3. Some pedons have a dark colored buried soil below a depth of 40 inches.

Formation of the Soils

Soil-forming processes act on deposited or accumulated geologic material. The characteristics of the soil are determined by (1) the physical and mineralogical composition of the parent material; (2) the climate under which the soil material accumulated and has existed since accumulation; (3) the kind of plant and animal life on and in the soil; (4) the topography; and (5) the length of time that the processes of soil formation have acted on the soil material *(5)*. These factors of soil formation are so closely interrelated in their effects on the soil that few generalizations can be made regarding the effect of any one unless conditions are specified for the other four.

Climate and plant and animal life, chiefly plants, are active factors of soil formation. They act on the parent material that has accumulated through the weathering of rocks, slowly changing it into a natural body that has genetically related horizons. The effects of climate and plant and animal life are conditioned by relief. The parent material affects the kind of soil profile that forms and, in extreme cases, determines it almost entirely. Finally, time is needed for changing the parent material into a soil. Some time is always needed for the differentiation of soil horizons. Usually, a long time is needed for the development of distinct horizons.

Parent Material

Parent material is the unconsolidated geologic material in which the soil forms. It determines the chemical and mineralogical composition of the soil. The dominant parent materials in Calhoun County are loess, alluvium, lacustrine deposits, and residuum.

Calhoun County was never covered by glacial ice *(11)*. The Mississippi and Illinois River Valleys, however, received tremendous amounts of glacial meltwater as glaciers to the north retreated. This glacial meltwater contained large amounts of sediment that was deposited on flood plains. As the flood plains dried with the receeding of glaciers, the river valleys were then left exposed and the predominantly westerly winds picked up the silt, or loess, and transported it many miles downwind. Generally, the loess is thicker near its source on the west side of the county. It ranges in thickness from a few inches on steep and very steep side slopes to more than 80 feet on ridgetops *(6)*. The majority of the upland soils in the county formed in loess. Examples are Fayette, Seaton, Sylvan, and Hamburg soils.

Alluvium is material that has recently been deposited on flood plains by floodwaters. It varies in texture. The soils in the major river valleys and along smaller creeks and streams formed in alluvium. Examples of these are Tice, Beaucoup, Haymond, and Wakeland soils.

Lacustrine material was deposited from still or ponded glacial meltwater. In Calhoun County, these deposits are very clayey. During the glacial retreat, blockage of the Illinois River caused a lake to be formed at the mouth of the Illinois River. This lake existed long enough for the smaller sized clay particles to settle out. The accumulation of clayey material formed what is now known as Deer Plain Terrace *(6)*. The soils on terraces generally are very poorly drained to somewhat poorly drained, and very slowly permeable. Examples of these are Booker, Okaw, and Hurst soils.

Calhoun County is divided by an east-west oriented bedrock structural feature called the Cap au Gres faulted flexure. The bedrock surface is at roughly the same elevation on both sides of the fault, but vertical movement along the fault has brought younger rocks south of the fault to the surface.

In the northern and central parts of Calhoun County, the Sedalia, Burlington, and Keokuk Formations of the Mississippian System form the bedrock surface. These formations are predominantly limestone, and the latter two are cherty. An occasional sinkhole occurs in areas of these formations. The bedrock surface, now covered with loess, is nearly level. This landscape feature is an old erosional surface and is referred to as the Calhoun Peneplain *(6)*. The validity of the peneplain concept has been disputed for a long time. However, the stream pebbles beneath the loess on upland divides and the thick accumulations of cherty and clayey residuum overlying the bedrock surface are evidence supporting the concept of the Calhoun Peneplain.

The Sedalia and Burlington Limestones are the major cliff-forming units that crop out along the Illinois River. These and other limestones and Hannibal Shale occasionally crop out on side slopes of tributary drainageways to the Illinois River. Along the Mississippi River immediately north of the fault are outcrops of St. Peter Sandstone. This is the oldest bedrock unit and is exposed to a considerable extent in Calhoun County *(11)*.

South of the Cap au Gres fault, the bedrock surface is on the McLeansboro and Carbondale Formations of the Pennsylvanian System. These formations are younger than those forming the bedrock surface north of the fault. The McLeansboro Formation consists of thin beds of limestone and clay. It overlies the Carbondale Formation, which consists of shale, clay, limestone, and coal.

Bedrock outcrops along the Illinois River Valley south of the fault are extremely rare. They are part of the St. Louis Formation, which consists of thick Mississippian limestone. The formation underlies the extensive areas of karst topography that are generally south of the fault on the eastern side of the county.

Along the Mississippi River Valley, the outcrops are St. Louis Limestone or the Pennsylvanian-age Pottsville Formation, a variable unit of clay, sandstone, and shale.

The soils that formed in residuum generally are on the lower parts of steep slopes. Examples of these are Goss and Sogn soils.

Climate

Climate is important in the formation of soils. It determines the kind of plant and animal life on and in the soil. It also determines the amount of water available for weathering minerals and for transporting soil materials. Climate, through its influence on temperatures in the soil, determines the rate of chemical reaction that occurs in the soil.

The climate in Calhoun County is temperate and humid. It is presumed to be similar to the climate that existed when the soils were formed.

Heavy rains are harmful and destructive when they fall on soils exposed during farming operations. Early spring rains can cause extensive erosion when the soil is partially frozen and, therefore, restricts water intake, causing greater runoff. For more detailed information on the climate of this county, see the section "General Nature of the County."

Plant and Animal Life

Plants are the principal living organisms affecting the soils in Calhoun County. Microorganisms, earthworms, insects, and large burrowing animals that live in or on the soil and human activities, however, also have affected soil formation.

The main contribution of plant and animal life is the addition of organic matter and nitrogen to the soil. The kind of organic material on and in the soil depends on the kind of plants that grew on the soil. The remains of these plants accumulate in or on the surface layer, decay, and eventually become soil organic matter. The roots of the plants provide channels for the downward movement of water through the soil and also add organic matter as they decay. Burrowing animals, such as earthworms, cicadas, and groundhogs, help to incorporate the organic matter into the soil. Bacteria help to break down the organic matter so that it can be used by growing plants.

Man has greatly altered the surface layer and the soil environment by clearing the forests and plowing the soil. Man has mixed the soil layers, moved soil from place to place, added fertilizer and lime, and introduced new plants. In places, accelerated erosion has removed most of the original surface layer and exposed the undesirable subsoil layers.

Most of the soils in Calhoun County formed under hardwood forests. These forests contributed organic matter to the soil mainly in the form of leaf litter. Soils that formed under forest vegetation characteristically have a very thin, dark colored surface layer; a leached, light colored subsurface layer; and a brighter colored subsoil. Fayette, Seaton, and Stronghurst soils are examples of soils that formed under forest vegetation.

The bottom land areas in Calhoun County developed under a mixture of trees and grasses. Most soils on bottom lands have a dark color, which is related more to the color of the sediments deposited by flooding than to the native vegetation. Beaucoup, Haymond, and Tice soils, for example, are on bottom lands.

Topography

Topography, or relief, has had a marked influence on the soils of Calhoun County through its effect on natural drainage, water erosion, plant cover, and soil temperature. In Calhoun County slopes range from 0 to

85 percent. The natural soil drainage ranges from well drained in soils on convex ridgetops and side slopes to very poorly drained in soils on nearly level bottom lands.

Topography determines, to a large extent, how much water infiltrates into a soil and how much runs off the surface. Runoff is greatest and infiltration is lowest on the steeper slopes. In general, runoff decreases and infiltration increases as the slope decreases. In low areas water is temporarily ponded because of runoff from adjacent slopes.

Natural drainage is also influenced by topography. This, through its effect on aeration of the soil, largely determines the color of the subsoil. Water and air move freely through soils that are well drained, but slowly through soils that are poorly drained. In soils that are well aerated, the iron and aluminum compounds that give most soils their color are oxidized and are brightly colored. Fayette and Seaton soils are examples. Poorly aerated soils have dull gray, mottled colors. Booker and Okaw soils are examples.

Topography also greatly influences the intensity of soil erosion. Although some erosion occurs on almost all sloping soils, erosion generally becomes more of a hazard as slope and runoff increase.

Time

A long period of time is required for distinct soil profiles to develop. The length of time required depends mainly on the kind and nature of the parent materials and on the topography. Except for those soils formed in recent alluvium, the soils in the county have been forming long enough for the interaction of the soil-forming factors to become evident.

Soils that formed in recent sediments have weak horizon development. The surface layer of these soils may show a slight increase in organic matter content, and the subsoil may have a weak structure. Examples are Haymond, Tice, and Wakeland soils.

Soils that formed on stable landscapes have distinct horizons. On these soils some of the finer textured material in the surface layer has moved into the subsoil, causing changes in the texture, structure, and color of the subsoil. Examples of soils with distinct profile characteristics are Seaton, Fayette, and Rozetta soils.

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Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to flooding.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained. —Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, and clay.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon. —An organic layer of fresh and decaying plant residue.

A horizon. —The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

E horizon. —The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon. —The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are as follows—

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called groundwater runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-80 at both White Hall and Jerseyville, Illinois)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have--		Average number of growing degree days*	Average	2 years in 10 will have--		Average number of days with 0.10 inch or more	Average snowfall
				Maximum temperature higher than--	Minimum temperature lower than--			Less than--	More than--		
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	37.3	17.8	27.6	40.8	11.7	4	1.58	0.42	2.37	4	5.6
February----	42.8	22.4	32.6	46.8	17.8	7	1.79	.59	2.59	4	4.4
March-------	53.3	31.0	42.1	58.2	28.7	54	3.17	1.25	4.45	6	5.0
April-------	67.2	42.9	55.1	69.2	40.9	216	3.91	1.51	5.53	7	.5
May---------	76.4	52.1	64.3	78.9	49.2	456	3.72	1.52	5.20	7	.0
June--------	85.0	61.2	73.1	86.4	59.0	702	3.84	1.23	5.60	6	.0
July--------	88.8	64.7	76.8	91.5	64.0	836	3.62	1.34	5.16	6	.0
August------	86.9	62.5	74.7	88.1	62.1	775	3.51	1.11	5.14	5	.0
September---	81.2	54.7	67.9	84.6	53.8	546	3.30	.95	4.90	5	.0
October-----	69.8	43.6	56.7	72.2	42.4	257	2.58	.64	3.90	5	.0
November----	54.1	32.9	43.5	57.7	32.1	58	2.48	.87	3.56	5	1.8
December----	42.2	23.9	33.0	45.7	19.9	8	1.99	.40	3.07	4	3.7
Yearly:											
Average---	65.4	42.5	54.0	---	---	---	---	---	---	---	---
Total-----	---	---	---	---	---	3,919	35.49	---	---	64	21.0

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1951-80 at both White Hall and Jerseyville, Illinois)

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Mar. 8	Mar. 22	Mar. 30
2 years in 10 later than--	Mar. 18	Mar. 29	Apr. 7
5 years in 10 later than--	Mar. 26	Apr. 7	Apr. 14
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 19	Oct. 10	Oct. 3
2 years in 10 earlier than--	Oct. 30	Oct. 22	Oct. 11
5 years in 10 earlier than--	Nov. 7	Oct. 29	Oct. 19

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-80 at both White Hall and Jerseyville, Illinois)

Probability	Daily minimum temperature during growing season		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	194	175	156
8 years in 10	202	182	162
5 years in 10	218	196	174
2 years in 10	234	209	186
1 year in 10	243	216	192

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
19D2	Sylvan silt loam, 10 to 15 percent slopes, eroded	1,575	0.9
19D3	Sylvan silty clay loam, 10 to 15 percent slopes, severely eroded	775	0.4
19F3	Sylvan silty clay loam, 15 to 30 percent slopes, severely eroded	1,780	1.0
30G	Hamburg silt loam, 30 to 65 percent slopes	1,550	0.9
70	Beaucoup silty clay loam	13,735	7.6
75B	Drury silt, 2 to 5 percent slopes	885	0.5
75C	Drury silt, 5 to 10 percent slopes	560	0.3
84	Okaw silty clay loam	1,160	0.6
92	Sarpy sand	330	0.2
274B	Seaton silt, 2 to 5 percent slopes	730	0.4
274C2	Seaton silt loam, 5 to 10 percent slopes, eroded	7,830	4.4
274D2	Seaton silt loam, 10 to 18 percent slopes, eroded	4,165	2.3
274F	Seaton silt, 18 to 30 percent slopes	21,840	12.1
274F3	Seaton silt loam, 18 to 30 percent slopes, severely eroded	3,380	1.9
274G	Seaton silt, 30 to 60 percent slopes	31,345	17.4
278A	Stronghurst silt loam, 0 to 3 percent slopes	710	0.4
279C2	Rozetta silt loam, 4 to 10 percent slopes, eroded	1,290	0.7
279D3	Rozetta silty clay loam, 10 to 15 percent slopes, severely eroded	1,005	0.6
280B	Fayette silt loam, 1 to 5 percent slopes	1,190	0.7
280C2	Fayette silt loam, 5 to 10 percent slopes, eroded	8,770	4.9
280D2	Fayette silt loam, 10 to 18 percent slopes, eroded	8,350	4.6
284	Tice silt loam	7,435	4.1
331	Haymond silt	6,445	3.6
333	Wakeland silt loam	7,860	4.4
338	Hurst silt loam	325	0.2
415	Orion silt loam	1,925	1.1
430B	Raddle silt loam, 1 to 5 percent slopes	2,375	1.3
457	Booker clay	2,535	1.4
504G	Sogn flaggy silt loam, 30 to 65 percent slopes	1,710	1.0
580D3	Fayette silty clay loam, karst, 5 to 15 percent slopes, severely eroded	1,100	0.6
606F	Goss cherty silt loam, 15 to 30 percent slopes	910	0.5
606G	Goss cherty silt loam, 30 to 70 percent slopes	6,325	3.5
741A	Oakville loamy fine sand, loamy substratum, 0 to 3 percent slopes	305	0.2
741D2	Oakville loamy fine sand, loamy substratum, 10 to 15 percent slopes, eroded	200	0.1
785G	Lacrescent very flaggy silt loam, 30 to 70 percent slopes	685	0.4
864	Pits, quarries	55	*
1070	Beaucoup silty clay loam, wet	3,230	1.8
	Water	23,465	13.0
	Total	179,840	100.0

* Less than 0.1 percent.

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
70	Beaucoup silty clay loam (where drained)
75B	Drury silt, 2 to 5 percent slopes
274B	Seaton silt, 2 to 5 percent slopes
278A	Stronghurst silt loam, 0 to 3 percent slopes (where drained)
280B	Fayette silt loam, 1 to 5 percent slopes
284	Tice silt loam
331	Haymond silt (where protected from flooding or not frequently flooded during the growing season)
333	Wakeland silt loam (where drained and either protected from flooding or not frequently flooded during the growing season)
415	Orion silt loam (where protected from flooding or not frequently flooded during the growing season)
430B	Raddle silt loam, 1 to 5 percent slopes
457	Booker clay (where drained)

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Tons	AUM*
19D2 Sylvan	IIIe	101	32	48	4.4	7.5
19D3 Sylvan	IVe	93	29	44	4.1	6.9
19F3 Sylvan	VIe	---	---	---	3.2	5.4
30G Hamburg	VIIe	---	---	---	---	---
70 Beaucoup	IIw	138	46	55	---	---
75B Drury	IIe	125	40	56	4.9	8.2
75C Drury	IIIe	122	39	55	4.9	7.8
84 Okaw	IIIw	84	28	41	---	---
92 Sarpy	IVs	---	---	15	0.9	2.5
274B Seaton	IIe	116	35	49	4.8	7.8
274C2 Seaton	IIIe	110	33	46	4.5	7.4
274D2 Seaton	IIIe	105	32	46	4.3	7.1
274F Seaton	VIe	---	---	---	3.6	5.9
274F3 Seaton	VIIe	---	---	---	3.1	4.5
274G Seaton	VIIe	---	---	---	2.7	4.5
278A Stronghurst	IIw	138	42	55	5.3	8.8
279C2 Rozetta	IIIe	123	38	51	4.9	8.2
279D3 Rozetta	VIe	---	---	50	4.3	7.2
280B Fayette	IIe	128	50	52	5.1	8.6

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Tons	AUM*
280C2 Fayette	IIIe	121	37	50	4.9	8.2
280D2 Fayette	IVe	114	35	47	4.7	7.8
284 Tice	IIw	130	40	---	4.8	8.5
331 Haymond	IIw	140	45	---	3.7	8.0
333 Wakeland	IIw	125	44	---	4.1	7.8
338 Hurst	IIIw	87	32	45	3.6	6.7
415 Orion	IIw	125	44	---	4.1	7.8
430B Raddle	IIe	148	45	58	5.7	9.7
457 Booker	IIIw	78	28	34	---	---
504G Sogn	VIIs	---	---	---	---	---
580D3 Fayette	IVe	123	41	---	5.2	6.3
606F, 606G Goss	VIIs	---	---	---	---	---
741A Oakville	IIIs	60	23	28	2.9	4.8
741D2 Oakville	VIs	---	---	---	2.6	4.2
785G Lacrescent	VIIe	---	---	---	---	---
864**. Pits						
1070 Beaucoup	Vw	---	---	---	---	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Volume*	
19F3------------ Sylvan	6R	Moderate	Moderate	Moderate	Slight	Yellow poplar-------	90	90	White oak, black walnut, northern red oak, green ash, eastern white pine, red pine, sugar maple.
						White oak-----------	80	62	
						Northern red oak----	80	62	
						Black walnut--------	---	---	
30G------------- Hamburg	2R	Severe	Severe	Severe	Slight	White oak-----------	45	30	Bur oak, eastern redcedar, white oak.
						Bur oak-------------	---	---	
						Eastern redcedar----	---	---	
						Post oak------------	---	---	
						Black oak-----------	---	---	
84-------------- Okaw	4W	Slight	Severe	Severe	Severe	Pin oak-------------	70	52	Pin oak, baldcypress, green ash, water tupelo, red maple, swamp white oak.
						Blackjack oak-------	60	43	
						Black oak-----------	55	38	
						White oak-----------	---	---	
274F, 274F3----- Seaton	6R	Moderate	Moderate	Moderate	Slight	Yellow poplar-------	90	90	White oak, black walnut, northern red oak, green ash, red pine, sugar maple.
						White oak-----------	90	72	
						Northern red oak----	80	62	
						Black walnut--------	---	---	
274G------------ Seaton	6R	Severe	Severe	Severe	Slight	Yellow poplar-------	90	90	White oak, black walnut, northern red oak, green ash, red pine, sugar maple.
						White oak-----------	90	72	
						Northern red oak----	80	62	
						Black walnut--------	---	---	
279D3----------- Rozetta	4A	Slight	Slight	Slight	Slight	White oak-----------	80	62	Eastern white pine, northern red oak, green ash, Scotch pine, yellow poplar.
						Northern red oak----	80	62	
						Yellow poplar-------	90	90	
						Black walnut--------	---	---	
338------------- Hurst	4C	Slight	Slight	Moderate	Moderate	White oak-----------	70	52	Austrian pine, green ash, pin oak, eastern redcedar, red maple, shortleaf pine, baldcypress.
						Southern red oak----	70	52	
						White ash-----------	---	---	
						Bur oak-------------	---	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Volume*	
580D3----------- Fayette	4A	Slight	Slight	Slight	Slight	White oak-----------	80	62	Eastern white pine, northern red oak, green ash, yellow poplar.
						Northern red oak----	80	62	
						Yellow poplar-------	90	90	
						Black walnut--------	---	---	
606F------------ Goss	3R	Slight	Moderate	Moderate	Slight	White oak-----------	60	43	Sweetgum, yellow poplar, green ash.
						Shortleaf pine------	---	---	
						Post oak------------	---	---	
						Blackjack oak-------	---	---	
						Black oak-----------	---	---	
606G------------ Goss	3R	Moderate	Severe	Severe	Slight	White oak-----------	60	43	Sweetgum, yellow poplar, green ash.
						Shortleaf pine------	---	---	
						Post oak------------	---	---	
						Blackjack oak-------	---	---	
						Black oak-----------	---	---	
741D2----------- Oakville	4S	Slight	Slight	Severe	Slight	White oak-----------	70	52	Eastern white pine, red pine, jack pine.
						Red pine------------	78	150	
						Eastern white pine--	85	196	
						Jack pine-----------	68	100	
1070------------ Beaucoup	5W	Slight	Severe	Moderate	Moderate	Pin oak-------------	90	72	Eastern cottonwood, red maple, American sycamore, sweetgum, pin oak.
						Eastern cottonwood--	100	128	
						Sweetgum------------	---	---	
						Cherrybark oak------	---	---	
						American sycamore---	---	---	

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

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TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

(The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil)

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
19D2, 19D3, 19F3 Sylvan	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
30G Hamburg	Osageorange, Russian olive, eastern redcedar, Washington hawthorn.	Honeylocust, northern catalpa, bur oak, black locust, green ash.	Siberian elm	---
70 Beaucoup	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
75B, 75C Drury	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
84 Okaw	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
92 Sarpy	Siberian peashrub	Osageorange, northern whitecedar, white spruce, nannyberry viburnum, eastern redcedar, Washington hawthorn, green ash.	Black willow	Eastern cottonwood.
274B, 274C2, 274D2, 274F, 274F3, 274G Seaton	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
278A Stronghurst	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
279C2, 279D3 Rozetta	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
280B, 280C2, 280D2 Fayette	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
284----- Tice	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
331----- Haymond	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
333----- Wakeland	Amur honeysuckle, Amur privet, American cranberrybush, silky dogwood.	Northern whitecedar, Austrian pine, white fir, blue spruce, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
338----- Hurst	Washington hawthorn, Amur privet, arrowwood, Amur honeysuckle, eastern redcedar, American cranberrybush.	Austrian pine, green ash, Osageorange.	Eastern white pine, pin oak.	---
415----- Orion	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
430B----- Raddle	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
457----- Booker	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
504G. Sogn				
580D3----- Fayette	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
606F, 606G----- Goss	Autumn olive	Eastern redcedar, Austrian pine, honeylocust, hackberry, green ash, bur oak, Russian olive.	Siberian elm	---
741A, 741D2----- Oakville	Common ninebark, American cranberrybush, autumn olive, silky dogwood, lilac, Amur privet.	White spruce, Manchurian crabapple.	Eastern white pine, red pine, Norway spruce.	Imperial Carolina poplar.

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TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
785G. Lacrescent				
864*. Pits				
1070 Beaucoup	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
19D2, 19D3 Sylvan	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
19F3 Sylvan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
30G Hamburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
70 Beaucoup	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
75B Drury	Slight	Slight	Moderate: slope.	Slight	Slight.
75C Drury	Slight	Slight	Severe: slope.	Slight	Slight.
84 Okaw	Severe: flooding, ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.
92 Sarpy	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy, flooding.	Severe: too sandy.	Severe: flooding.
274B Seaton	Slight	Slight	Moderate: slope.	Slight	Slight.
274C2 Seaton	Slight	Slight	Severe: slope.	Slight	Slight.
274D2 Seaton	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
274F, 274F3 Seaton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
274G Seaton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
278A Stronghurst	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
279C2 Rozetta	Slight	Slight	Severe: slope.	Severe: erodes easily.	Slight.
279D3 Rozetta	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
280B Fayette	Slight	Slight	Moderate: slope.	Slight	Slight.
280C2 Fayette	Slight	Slight	Severe: slope.	Slight	Slight.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
280D2 Fayette	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
284 Tice	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Moderate: wetness.	Moderate: wetness, flooding.
331 Haymond	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
333 Wakeland	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: flooding, wetness.	Severe: flooding.
338 Hurst	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
415 Orion	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
430B Raddle	Slight	Slight	Moderate: slope.	Slight	Slight.
457 Booker	Severe: flooding, ponding, percs slowly.	Severe: ponding, too clayey, percs slowly.	Severe: too clayey, ponding.	Severe: ponding, too clayey.	Severe: ponding, too clayey.
504G Sogn	Severe: slope, thin layer, area reclaim.	Severe: slope, thin layer, area reclaim.	Severe: slope, small stones.	Severe: slope.	Severe: large stones, thin layer, slope.
580D3 Fayette	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
606F Goss	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: droughty, slope.
606G Goss	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: droughty, slope.
741A Oakville	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: droughty.
741D2 Oakville	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.	Moderate: droughty, slope.
785G Lacrescent	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1070 Beaucoup	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
19D2, 19D3 Sylvan	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
19F3 Sylvan	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
30G Hamburg	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
70 Beaucoup	Good	Good	Good	Fair	Fair	Good	Good	Good	Good	Good.
75B Drury	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
75C Drury	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
84 Okaw	Fair	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good.
92 Sarpy	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
274B, 274C2, 274D2 Seaton	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
274F Seaton	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
274F3, 274G Seaton	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
278A Stronghurst	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
279C2 Rozetta	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
279D3 Rozetta	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
280B Fayette	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
280C2, 280D2 Fayette	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
284 Tice	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
331 Haymond	Good	Good	Fair	Good	Good	Poor	Poor	Good	Good	Poor.
333 Wakeland	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hardwood trees	Conif-erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
338---------------- Hurst	Fair	Good	Good	Good	Fair	Fair	Fair	Good	Good	Fair.
415---------------- Orion	Good	Good	Good	Good	Good	Good	Fair	Good	Good	Good.
430B--------------- Raddle	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
457---------------- Booker	Poor	Poor	Fair	Poor	Poor	Poor	Good	Poor	Poor	Fair.
504G--------------- Sogn	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
580D3-------------- Fayette	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
606F--------------- Goss	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
606G--------------- Goss	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
741A, 741D2-------- Oakville	Poor	Poor	Fair	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
785G--------------- Lacrescent	Poor	Poor	Fair	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
864*. Pits										
1070--------------- Beaucoup	Poor	Poor	Fair	Poor	Poor	Good	Good	Poor	Fair	Good.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
19D2, 19D3 Sylvan	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
19F3 Sylvan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
30G Hamburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
70 Beaucoup	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding.
75B Drury	Slight	Slight	Slight	Slight	Severe: low strength, frost action.	Slight.
75C Drury	Slight	Slight	Slight	Moderate: slope.	Severe: low strength, frost action.	Slight.
84 Okaw	Severe: ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: low strength, ponding.	Severe: ponding.
92 Sarpy	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
274B Seaton	Slight	Slight	Slight	Slight	Severe: low strength, frost action.	Slight.
274C2 Seaton	Slight	Slight	Slight	Moderate: slope.	Severe: low strength, frost action.	Slight.
274D2 Seaton	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
274F, 274F3, 274G Seaton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
278A Stronghurst	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
279C2 Rozetta	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
279D3 Rozetta	Moderate: wetness, slope.	Moderate: shrink-swell, slope.	Moderate: wetness, slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
280B Fayette	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
280C2 Fayette	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: frost action, low strength.	Slight.
280D2 Fayette	Moderate: slope.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: frost action, low strength.	Moderate: slope.
284 Tice	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding, frost action.	Moderate: wetness, flooding.
331 Haymond	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, frost action.	Severe: flooding.
333 Wakeland	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Severe: flooding.
338 Hurst	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.
415 Orion	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding, frost action.	Severe: flooding.
430B Raddle	Slight	Slight	Slight	Slight	Severe: frost action.	Slight.
457 Booker	Severe: ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding, too clayey.
504G Sogn	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: large stones, thin layer, slope.
580D3 Fayette	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
606F, 606G Goss	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
741A-------------- Oakville	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty.
741D2------------- Oakville	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
785G-------------- Lacrescent	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
864*. Pits						
1070-------------- Beaucoup	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
19D2, 19D3 Sylvan	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
19F3 Sylvan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
30G Hamburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
70 Beaucoup	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
75B Drury	Slight	Moderate: seepage, slope.	Slight	Slight	Good.
75C Drury	Slight	Severe: slope.	Slight	Slight	Good.
84 Okaw	Severe: ponding, percs slowly.	Slight	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
92 Sarpy	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, too sandy.	Severe: flooding, seepage.	Poor: seepage, too sandy.
274B Seaton	Slight	Moderate: seepage, slope.	Slight	Slight	Good.
274C2 Seaton	Slight	Severe: slope.	Slight	Slight	Good.
274D2 Seaton	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
274F, 274F3, 274G Seaton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
278A Stronghurst	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
279C2 Rozetta	Moderate: wetness.	Severe: slope.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
279D3 Rozetta	Moderate: wetness, slope.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Fair: too clayey, slope.
280B Fayette	Slight	Moderate: slope, seepage.	Moderate: too clayey.	Slight	Fair: too clayey.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
280C2 Fayette	Slight	Severe: slope.	Moderate: too clayey.	Slight	Fair: too clayey.
280D2 Fayette	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: slope, too clayey.
284 Tice	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: hard to pack.
331 Raymond	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Good.
333 Wakeland	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
338 Hurst	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
415 Orion	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
430B Raddle	Slight	Moderate: seepage, slope.	Slight	Slight	Good.
457 Booker	Severe: ponding, percs slowly.	Slight	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
504G Sogn	Severe: thin layer, seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, slope, thin layer.
580D3 Fayette	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
606F, 606G Goss	Severe: slope.	Severe: seepage, slope.	Severe: slope, too clayey, large stones.	Severe: slope.	Poor: too clayey, small stones, slope.
741A Oakville	Severe: percs slowly, poor filter.	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Poor: seepage, too sandy.
741D2 Oakville	Severe: percs slowly, poor filter.	Severe: seepage, slope.	Severe: too sandy.	Severe: seepage.	Poor: seepage, too sandy.
785G Lacrescent	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: large stones, slope.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
864*. Pits					
1070---------------- Beaucoup	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
19D2 Sylvan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
19D3 Sylvan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
19F3 Sylvan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
30G Hamburg	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
70 Beaucoup	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
75B, 75C Drury	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
84 Okaw	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
92 Sarpy	Good	Probable	Improbable: too sandy.	Poor: too sandy.
274B, 274C2 Seaton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
274D2 Seaton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
274F, 274F3 Seaton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
274G Seaton	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
278A Stronghurst	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
279C2 Rozetta	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
279D3 Rozetta	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
280B, 280C2 Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
280D2 Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
284 Tice	Fair: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Good.
331 Haymond	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
333 Wakeland	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
338 Hurst	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
415 Orion	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
430B Raddle	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
457 Booker	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
504G Sogn	Poor: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock.
580D3 Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
606F Goss	Fair: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
606G Goss	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
741A, 741D2 Oakville	Fair: thin layer.	Probable	Improbable: too sandy.	Poor: too sandy.
785G Lacrescent	Poor: slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
864*. Pits				
1070 Beaucoup	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
19D2, 19D3, 19F3-- Sylvan	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
30G--------------- Hamburg	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
70---------------- Beaucoup	Slight---------	Severe: ponding.	Ponding, flooding, frost action.	Ponding, flooding.	Ponding--------	Wetness.
75B, 75C---------- Drury	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
84---------------- Okaw	Slight---------	Severe: hard to pack, ponding.	Ponding, percs slowly.	Ponding, percs slowly.	Erodes easily, ponding, percs slowly.	Wetness, erodes easily, percs slowly.
92---------------- Sarpy	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
274B, 274C2------- Seaton	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
274D2, 274F, 274F3, 274G------ Seaton	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
278A-------------- Stronghurst	Moderate: seepage.	Severe: wetness.	Frost action---	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
279C2------------- Rozetta	Moderate: seepage, slope.	Slight---------	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
279D3------------- Rozetta	Severe: slope.	Slight---------	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
280B, 280C2------- Fayette	Moderate: slope, seepage.	Slight---------	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
280D2------------- Fayette	Severe: slope.	Slight---------	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
284--------------- Tice	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness--------	Wetness--------	Favorable.
331--------------- Haymond	Moderate: seepage.	Severe: piping.	Deep to water	Flooding-------	Erodes easily	Erodes easily.
333--------------- Wakeland	Moderate: seepage.	Severe: piping, wetness.	Flooding, frost action.	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Wetness, erodes easily.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
338 Hurst	Slight	Severe: wetness.	Percs slowly	Wetness, percs slowly.	Erodes easily, wetness.	Wetness, erodes easily.
415 Orion	Moderate: seepage.	Severe: piping, wetness.	Flooding, frost action.	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
430B Raddle	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope	Erodes easily	Erodes easily.
457 Booker	Slight	Severe: hard to pack, ponding.	Ponding, percs slowly.	Ponding, slow intake, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
504G Sogn	Severe: depth to rock, slope.	Severe: large stones, thin layer.	Deep to water	Slope, large stones, thin layer.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
580D3 Fayette	Severe: slope.	Slight	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
606F, 606G Goss	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
741A Oakville	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Droughty.
741D2 Oakville	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
785G Lacrescent	Severe: seepage, slope.	Severe: seepage, piping, large stones.	Deep to water	Slope, large stones.	Slope, large stones.	Large stones, slope.
864*. Pits						
1070 Beaucoup	Slight	Severe: ponding.	Ponding, flooding, frost action.	Ponding, flooding.	Ponding	Wetness.

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* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
19D2 Sylvan	0-6	Silt loam	CL-ML, CL	A-4, A-6	0	100	100	100	95-100	25-35	5-15
	6-29	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-50	20-30
	29-60	Silt loam, silt	CL, CL-ML	A-6, A-4	0	100	100	95-100	95-100	20-40	5-20
19D3, 19F3 Sylvan	0-7	Silty clay loam	CL	A-7, A-6	0	100	100	100	95-100	35-50	20-30
	7-24	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-50	20-30
	24-60	Silt loam	CL, CL-ML	A-6, A-4	0	100	100	95-100	95-100	20-40	5-20
30G Hamburg	0-9	Silt loam	CL-ML, ML	A-4	0	100	100	100	95-100	<25	NP-5
	9-60	Silt loam, very fine sandy loam, silt.	CL-ML, ML	A-4	0	100	100	100	95-100	<25	NP-5
70 Beaucoup	0-12	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	85-100	30-45	15-25
	12-33	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	85-100	30-45	15-30
	33-48	Stratified fine sandy loam to silty clay loam.	CL, CL-ML	A-6, A-7, A-4	0	100	100	90-100	65-95	25-45	5-25
	48-60	Silty clay loam	CL, CL-ML	A-6, A-4	0	100	100	90-100	60-95	20-40	5-20
75B, 75C Drury	0-17	Silt	CL, CL-ML, ML	A-4, A-6	0	100	100	100	90-100	20-35	NP-15
	17-60	Silt loam	CL	A-6, A-4	0	100	100	95-100	90-100	25-35	8-15
84 Okaw	0-13	Silty clay loam	CL	A-7, A-6	0	100	100	95-100	90-100	35-50	15-30
	13-37	Silty clay, clay	CH	A-7	0	100	95-100	95-100	85-100	50-70	30-50
	37-60	Silty clay loam, silty clay, clay.	CH, CL	A-7	0	100	100	95-100	80-100	45-65	20-40
92 Sarpy	0-4	Sand	SM, SP-SM, SP	A-2-4, A-3	0	100	100	60-80	2-15	---	NP
	4-60	Sand, coarse sand	SM, SP, SP-SM	A-2-4, A-3	0	100	100	60-80	2-35	---	NP
274B Seaton	0-10	Silt, silt loam	CL, CL-ML, ML	A-4, A-6, A-7	0	100	100	100	95-100	20-45	5-20
	10-57	Silt loam	CL, CL-ML	A-6, A-4	0	100	100	100	90-100	25-40	5-20
	57-60	Silt loam, silt	CL, CL-ML	A-4, A-6	0	100	100	100	90-100	25-40	5-20
274C2, 274D2 Seaton	0-6	Silt loam	CL, CL-ML	A-4, A-6	0	100	100	100	95-100	20-35	5-15
	6-35	Silt loam	CL, CL-ML	A-6, A-4	0	100	100	100	90-100	25-40	5-20
	35-60	Silt loam, silt	CL, CL-ML	A-4, A-6	0	100	100	100	90-100	25-40	5-20
274F Seaton	0-8	Silt	CL, CL-ML, ML	A-4, A-6, A-7	0	100	100	100	95-100	20-45	5-20
	8-42	Silt loam	CL, CL-ML	A-6, A-4	0	100	100	100	90-100	25-40	5-20
	42-60	Silt loam, silt	CL, CL-ML	A-4, A-6	0	100	100	100	90-100	25-40	5-20
274F3 Seaton	0-8	Silt loam	CL, CL-ML	A-4, A-6	0	100	100	100	95-100	20-35	5-15
	8-39	Silt loam	CL, CL-ML	A-6, A-4	0	100	100	100	90-100	25-40	5-20
	39-60	Silt loam, silt	CL, CL-ML	A-4, A-6	0	100	100	100	90-100	25-40	5-20
274G Seaton	0-8	Silt	CL, CL-ML, ML	A-4, A-6, A-7	0	100	100	100	95-100	20-45	5-20
	8-39	Silt loam	CL, CL-ML	A-6, A-4	0	100	100	100	90-100	25-40	5-20
	39-60	Silt loam, silt	CL, CL-ML	A-4, A-6	0	100	100	100	90-100	25-40	5-20

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
278A Stronghurst	0-19	Silt loam	CL, CL-ML, ML	A-4, A-6	0	100	100	95-100	95-100	25-35	5-15
	19-60	Silty clay loam	CL, CH	A-7	0	100	100	100	98-100	40-55	20-35
279C2 Rozetta	0-7	Silt loam	CL	A-4, A-6	0	100	100	95-100	95-100	24-35	8-15
	7-35	Silty clay loam	CL	A-7, A-6	0	100	100	95-100	95-100	35-50	15-30
	35-60	Silt loam	CL	A-6, A-4	0	100	100	95-100	85-100	25-40	7-20
279D3 Rozetta	0-4	Silty clay loam	ML, CL	A-6, A-7	0	100	100	95-100	95-100	35-45	10-20
	4-42	Silty clay loam	CL	A-7, A-6	0	100	100	95-100	95-100	35-50	15-30
	42-60	Silt loam	CL	A-6, A-4	0	100	100	95-100	85-100	25-40	7-20
280B, 280C2, 280D2 Fayette	0-14	Silt loam	CL-ML, CL	A-4, A-6	0	100	100	100	95-100	25-35	5-15
	14-48	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
	48-60	Silt loam	CL	A-6	0	100	100	100	95-100	30-40	10-20
284 Tice	0-12	Silt loam	CL	A-6, A-7	0	100	100	90-100	80-95	30-45	10-20
	12-57	Silty clay loam, silt loam.	CL, CH	A-7	0	100	100	95-100	85-95	40-55	15-30
	57-60	Silt loam	CL-ML, CL	A-4, A-6, A-7	0	100	100	60-95	55-80	25-45	5-20
331 Haymond	0-8	Silt	ML	A-4	0	100	100	90-100	80-90	27-36	4-10
	8-35	Silt loam	ML	A-4	0	100	100	90-100	80-90	27-36	4-10
	35-60	Fine sandy loam, silt loam, loam.	ML, SM	A-4	0	95-100	90-100	80-100	35-90	27-36	4-10
333 Wakeland	0-9	Silt loam	ML, CL-ML	A-4	0	100	100	90-100	80-90	27-36	4-10
	9-60	Stratified silt loam to fine sandy loam.	ML	A-4	0	100	100	90-100	80-90	27-36	4-10
338 Hurst	0-8	Silt loam	CL, CL-ML	A-4, A-6	0	100	100	95-100	90-100	20-35	4-15
	8-14	Silty clay loam, silt loam.	CL, CL-ML	A-6, A-4	0	100	100	95-100	90-100	20-35	5-15
	14-32	Silty clay loam, silty clay, clay.	CL, CH	A-7	0	100	100	95-100	90-100	40-60	20-35
	32-60	Sandy clay loam, silty clay, clay loam.	CL, CH	A-6, A-7	0	100	100	90-100	85-100	35-55	15-30
415 Orion	0-6	Silt loam	CL, CL-ML	A-4	0	100	100	85-100	80-100	20-30	4-10
	6-22	Silt loam	CL, CL-ML	A-4	0	100	100	90-100	70-80	20-30	4-10
	22-60	Silt loam	CL, CL-ML	A-6, A-4	0	100	100	85-100	85-100	20-40	4-18
430B Raddle	0-18	Silt loam	CL, CL-ML	A-4, A-6	0	100	100	95-100	85-100	25-35	4-15
	18-60	Silt loam	CL, CL-ML	A-4, A-6	0	100	100	90-100	80-100	20-30	4-14
457 Booker	0-9	Clay	CL, CH	A-7	0	100	100	95-100	95-100	45-75	30-45
	9-60	Clay	CH	A-7	0	100	100	100	95-100	65-85	40-55
504G Sogn	0-7	Flaggy silt loam	CL, SC	A-6, A-7	10-20	85-100	70-95	60-90	45-85	25-45	10-25
	7-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
580D3 Fayette	0-7	Silty clay loam	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
	7-38	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
	38-60	Silt loam	CL	A-6	0	100	100	100	95-100	30-40	10-20

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
606F, 606G------- Goss	0-2	Cherty silt loam	ML, CL, CL-ML	A-4	0-10	65-85	65-75	65-75	65-75	20-30	2-10
	2-16	Very cherty silty clay loam, cherty silt loam.	GM, GC, GM-GC	A-2	10-40	40-75	35-75	30-50	25-35	20-30	2-10
	16-60	Very cherty silty clay loam, cherty silty clay, very cherty silty clay.	GC, SC	A-7, A-2-7	10-45	45-70	20-65	20-50	20-45	50-70	30-40
741A, 741D2------ Oakville	0-7	Loamy fine sand	SM	A-2	0	100	100	55-75	15-25	---	NP
	7-43	Fine sand, loamy fine sand, loamy sand.	SM, SP, SP-SM	A-2, A-3	0	100	100	65-95	0-35	---	NP
	43-60	Silt loam, silty clay loam, loam.	CL	A-6, A-7	0	100	100	90-100	70-95	25-50	12-30
785G------------- Lacrescent	0-18	Very flaggy silt loam.	CL	A-6, A-7	15-30	80-100	70-100	60-95	50-90	30-45	10-20
	18-36	Extremely flaggy silty clay loam.	SM, SC, ML, CL	A-4, A-6, A-2, A-1	30-55	55-80	45-70	40-65	20-60	20-35	3-12
	36-60	Very flaggy silt loam.	SM, SC, ML, CL	A-4, A-6, A-2, A-1	50-65	50-75	40-65	35-60	15-55	10-35	NP-12
864*. Pits											
1070------------- Beaucoup	0-12	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	85-100	30-45	15-25
	12-41	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	85-100	30-45	15-30
	41-60	Stratified very fine sandy loam to silty clay loam.	CL, CL-ML	A-6, A-7, A-4	0	100	100	90-100	65-95	25-45	5-25

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
19D2---------------	0-6	20-27	1.20-1.40	0.6-2.0	0.20-0.22	5.6-7.3	Low-----------	0.37	5	6	1-2
Sylvan	6-29	25-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.37			
	29-60	18-27	1.30-1.50	0.6-2.0	0.20-0.22	6.6-8.4	Low-----------	0.37			
19D3, 19F3-------	0-7	27-32	1.25-1.45	0.6-2.0	0.20-0.22	5.6-7.3	Moderate-----	0.37	4	7	<.5
Sylvan	7-24	25-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.37			
	24-60	18-27	1.30-1.50	0.6-2.0	0.20-0.22	6.6-8.4	Low-----------	0.37			
30G---------------	0-9	6-12	1.20-1.30	0.6-2.0	0.20-0.24	6.6-8.4	Low-----------	0.43	5	4L	.5-1
Hamburg	9-60	6-12	1.20-1.30	0.6-2.0	0.17-0.22	7.4-8.4	Low-----------	0.43			
70-----------------	0-12	27-35	1.25-1.45	0.2-0.6	0.21-0.23	5.6-7.8	Moderate-----	0.32	5	7	5-6
Beaucoup	12-33	27-35	1.30-1.50	0.2-0.6	0.18-0.20	5.6-7.8	Moderate-----	0.32			
	33-48	15-30	1.35-1.55	0.2-0.6	0.18-0.22	5.6-7.8	Moderate-----	0.32			
	48-60	10-30	1.40-1.65	0.2-0.6	0.18-0.22	6.1-8.4	Moderate-----	0.32			
75B, 75C----------	0-17	8-15	1.20-1.40	0.6-2.0	0.20-0.24	5.6-8.4	Low-----------	0.37	5	5	1-2
Drury	17-60	10-20	1.25-1.45	0.6-2.0	0.20-0.22	5.6-7.3	Low-----------	0.37			
84-----------------	0-13	27-40	1.20-1.40	0.2-0.6	0.21-0.23	4.5-7.3	Moderate-----	0.43	2	7	1-3
Okaw	13-37	40-60	1.35-1.60	<0.06	0.09-0.18	4.5-6.0	High----------	0.32			
	37-60	35-60	1.45-1.70	<0.06	0.08-0.18	4.5-8.4	High----------	0.32			
92-----------------	0-4	2-5	1.20-1.50	>6.0	0.05-0.09	6.6-8.4	Low-----------	0.15	5	1	<.5
Sarpy	4-60	2-5	1.20-1.50	>6.0	0.05-0.09	7.4-8.4	Low-----------	0.15			
274B---------------	0-10	10-22	1.10-1.45	0.6-2.0	0.22-0.24	5.6-7.3	Low-----------	0.37	5	6	1-3
Seaton	10-57	18-27	1.20-1.60	0.6-2.0	0.20-0.22	5.1-7.3	Low-----------	0.37			
	57-60	10-25	1.20-1.50	0.6-2.0	0.20-0.22	5.6-8.4	Low-----------	0.37			
274C2, 274D2-----	0-6	15-22	1.10-1.20	0.6-2.0	0.22-0.24	5.6-7.3	Low-----------	0.37	5	6	1-2
Seaton	6-35	18-27	1.15-1.30	0.6-2.0	0.20-0.22	5.1-7.3	Low-----------	0.37			
	35-60	15-25	1.20-1.40	0.6-2.0	0.20-0.22	5.6-8.4	Low-----------	0.37			
274F---------------	0-8	10-22	1.10-1.45	0.6-2.0	0.22-0.24	5.6-7.3	Low-----------	0.37	5	6	1-3
Seaton	8-42	18-27	1.20-1.60	0.6-2.0	0.20-0.22	5.1-7.3	Low-----------	0.37			
	42-60	10-25	1.20-1.50	0.6-2.0	0.20-0.22	5.6-8.4	Low-----------	0.37			
274F3--------------	0-8	15-22	1.10-1.20	0.6-2.0	0.22-0.24	5.6-7.3	Low-----------	0.37	4	6	.5-1
Seaton	8-39	18-27	1.15-1.30	0.6-2.0	0.20-0.22	5.1-7.3	Low-----------	0.37			
	39-60	15-25	1.20-1.40	0.6-2.0	0.20-0.22	5.6-8.4	Low-----------	0.37			
274G---------------	0-8	10-22	1.10-1.45	0.6-2.0	0.22-0.24	5.1-7.3	Low-----------	0.37	5	6	1-3
Seaton	8-39	18-27	1.20-1.60	0.6-2.0	0.20-0.22	5.1-7.3	Low-----------	0.37			
	39-60	10-25	1.20-1.50	0.6-2.0	0.20-0.22	5.6-8.4	Low-----------	0.37			
278A---------------	0-19	20-27	1.25-1.45	0.6-2.0	0.22-0.24	5.1-7.3	Low-----------	0.37	5	6	1-3
Stronghurst	19-60	27-35	1.30-1.55	0.6-2.0	0.18-0.20	4.5-6.5	Moderate-----	0.37			
279C2--------------	0-7	15-27	1.20-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Low-----------	0.37	5	6	1-3
Rozetta	7-35	27-35	1.35-1.55	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.37			
	35-60	20-27	1.40-1.60	0.6-2.0	0.20-0.22	5.1-7.8	Low-----------	0.37			
279D3--------------	0-4	27-35	1.30-1.50	0.6-2.0	0.20-0.22	5.1-7.3	Moderate-----	0.37	4	7	.5-1
Rozetta	4-42	27-35	1.35-1.55	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.37			
	42-60	20-27	1.40-1.60	0.6-2.0	0.20-0.22	5.1-7.8	Low-----------	0.37			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
280B, 280C2,											
280D2-----------	0-14	15-25	1.30-1.35	0.6-2.0	0.20-0.22	5.1-7.3	Low----------	0.37	5	6	1-2
Fayette	14-48	25-35	1.30-1.45	0.6-2.0	0.18-0.20	4.5-6.0	Moderate-----	0.37			
	48-60	22-26	1.45-1.50	0.6-2.0	0.18-0.20	5.1-7.8	Moderate-----	0.37			
284--------------	0-12	22-35	1.25-1.45	0.6-2.0	0.21-0.24	6.1-7.8	Moderate-----	0.32	5	7	2-3
Tice	12-57	22-35	1.30-1.50	0.6-2.0	0.18-0.20	4.5-7.3	Moderate-----	0.32			
	57-60	15-27	1.40-1.60	0.6-2.0	0.11-0.18	5.1-7.3	Moderate-----	0.32			
331--------------	0-8	5-15	1.30-1.45	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	5	5	1-3
Haymond	8-35	10-18	1.30-1.45	0.6-2.0	0.20-0.22	5.6-7.3	Low----------	0.37			
	35-60	10-18	1.30-1.45	0.6-2.0	0.20-0.22	5.6-7.3	Low----------	0.37			
333--------------	0-9	10-17	1.30-1.50	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	5	5	1-3
Wakeland	9-60	10-17	1.30-1.50	0.6-2.0	0.20-0.22	5.6-7.3	Low----------	0.37			
338--------------	0-8	20-27	1.25-1.45	0.2-0.6	0.22-0.24	5.1-7.3	Low----------	0.43	3	6	1-2
Hurst	8-14	18-30	1.30-1.50	0.2-0.6	0.20-0.22	3.6-6.0	Low----------	0.43			
	14-32	35-48	1.45-1.70	<0.06	0.10-0.17	3.6-7.3	High---------	0.32			
	32-60	20-45	1.50-1.70	<0.06	0.10-0.18	4.5-7.8	High---------	0.32			
415--------------	0-6	10-18	1.20-1.30	0.6-2.0	0.22-0.24	5.6-7.8	Low----------	0.37	5	5	1-3
Orion	6-22	10-18	1.20-1.30	0.6-2.0	0.20-0.22	5.6-7.8	Low----------	0.37			
	22-60	10-27	1.25-1.45	0.6-2.0	0.18-0.22	5.6-7.8	Low----------	0.37			
430B-------------	0-18	10-18	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	5	6	2-4
Raddle	18-60	10-18	1.20-1.40	0.6-2.0	0.20-0.22	5.6-7.3	Low----------	0.43			
457--------------	0-9	40-70	1.30-1.50	<0.06	0.12-0.14	5.6-7.3	Very high----	0.28	5	4	1-3
Booker	9-60	60-75	1.30-1.50	<0.06	0.09-0.11	6.6-7.8	Very high----	0.28			
504G-------------	0-7	18-27	1.15-1.20	0.6-2.0	0.15-0.20	6.1-8.4	Low----------	0.24	1	8	2-3
Sogn	7-60	---	---	---	---	---	-------------	----			
580D3------------	0-7	25-32	1.35-1.45	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.37	4	7	<.5
Fayette	7-38	25-35	1.30-1.45	0.6-2.0	0.18-0.20	4.5-6.0	Moderate-----	0.37			
	38-60	22-26	1.45-1.50	0.6-2.0	0.18-0.20	5.1-7.8	Moderate-----	0.37			
606F, 606G-------	0-2	10-27	1.10-1.30	2.0-6.0	0.06-0.17	4.5-6.5	Low----------	0.24	2	8	1-2
Goss	2-16	20-30	1.10-1.30	2.0-6.0	0.06-0.10	4.5-6.0	Low----------	0.10			
	16-60	35-60	1.30-1.50	0.6-2.0	0.04-0.09	4.5-6.0	Moderate-----	0.10			
741A, 741D2------	0-7	2-14	1.30-1.55	6.0-20	0.09-0.12	5.6-7.3	Low----------	0.17	5	2	.5-2
Oakville	7-43	0-10	1.30-1.60	6.0-20	0.06-0.10	5.6-7.3	Low----------	0.15			
	43-60	24-35	1.60-1.75	0.2-0.6	0.14-0.20	6.1-8.4	Moderate-----	0.37			
785G-------------	0-18	18-33	1.25-1.40	0.6-2.0	0.15-0.22	6.6-7.8	Low----------	0.24	2	8	3-5
Lacrescent	18-36	8-23	1.30-1.50	0.6-6.0	0.06-0.09	6.6-7.8	Low----------	0.24			
	36-60	8-20	1.30-1.50	2.0-6.0	0.05-0.08	7.4-7.8	Low----------	0.24			
864*.											
Pits											
1070-------------	0-12	27-35	1.25-1.45	0.2-0.6	0.21-0.23	5.6-7.8	Moderate-----	0.32	5	7	5-6
Beaucoup	12-41	27-35	1.30-1.50	0.2-0.6	0.18-0.20	5.6-7.8	Moderate-----	0.32			
	41-60	15-30	1.35-1.55	0.2-0.6	0.18-0.22	5.6-7.8	Moderate-----	0.32			

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
19D2, 19D3, 19F3-- Sylvan	B	None--------	---	---	>6.0	---	---	High-----	Moderate	Moderate.
30G--------------- Hamburg	B	None--------	---	---	>6.0	---	---	High-----	Low------	Low.
70---------------- Beaucoup	B/D	Occasional	Brief-----	Mar-Jun	+.5-2.0	Apparent	Mar-Jun	High-----	High-----	Low.
75B, 75C---------- Drury	B	None--------	---	---	>6.0	---	---	High-----	Moderate	Moderate.
84---------------- Okaw	D	Rare--------	---	---	+.5-1.0	Apparent	Mar-Jun	High-----	High-----	High.
92---------------- Sarpy	A	Frequent----	Long------	Nov-Jun	>6.0	---	---	Low------	Low------	Low.
274B, 274C2, 274D2, 274F, 274F3, 274G------ Seaton	B	None--------	---	---	>6.0	---	---	High-----	Low------	Moderate.
278A-------------- Stronghurst	B	None--------	---	---	1.0-3.0	Apparent	Apr-Jun	High-----	High-----	Moderate.
279C2, 279D3------ Rozetta	B	None--------	---	---	4.0-6.0	Apparent	Mar-Jun	High-----	Moderate	Moderate.
280B, 280C2, 280D2------------ Fayette	B	None--------	---	---	>6.0	---	---	High-----	Moderate	Moderate.
284--------------- Tice	B	Occasional	Brief-----	Jan-Jun	1.5-3.0	Apparent	Mar-Jun	High-----	High-----	Low.
331--------------- Haymond	B	Frequent----	Brief-----	Jan-May	>6.0	---	---	High-----	Low------	Low.
333--------------- Wakeland	C	Frequent----	Brief-----	Jan-May	1.0-3.0	Apparent	Jan-Apr	High-----	High-----	Low.
338--------------- Hurst	D	None--------	---	---	1.0-3.0	Apparent	Feb-Apr	Moderate	High-----	High.
415--------------- Orion	C	Frequent----	Brief-----	Mar-May	1.0-3.0	Apparent	Nov-May	High-----	High-----	Low.
430B-------------- Raddle	B	None--------	---	---	>6.0	---	---	High-----	Moderate	Moderate.
457--------------- Booker	D	Rare--------	---	---	+.5-1.0	Perched	Nov-May	Moderate	High-----	Moderate.
504G-------------- Sogn	D	None--------	---	---	>6.0	---	---	Moderate	Low------	Low.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
580D3------------- Fayette	B	None--------	---	---	>6.0	---	---	High-----	Moderate	Moderate.
606F, 606G-------- Goss	B	None--------	---	---	>6.0	---	---	Moderate	Moderate	Moderate.
741A, 741D2------- Oakville	A	None--------	---	---	>6.0	---	---	Low------	Low------	Moderate.
785G-------------- Lacrescent	B	None--------	---	---	>6.0	---	---	Moderate	Low------	Low.
864*. Pits										
1070-------------- Beaucoup	B/D	Frequent----	Long------	Mar-Jun	+.5-2.0	Apparent	Mar-Jun	High-----	High-----	Low.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--ENGINEERING INDEX TEST DATA

(MAX means maximum dry density; OPT, optimum moisture; LL, liquid limit; PI, plasticity index; and UN, Unified)

Soil name and location	Sample number	Horizon	Depth	Moisture density		Percentage passing sieve--				LL	PI	Classification	
				MAX	OPT	No. 4	No. 10	No. 40	No. 200			AASHTO	UN
			In	Lb/ft3	Pct					Pct			
Hurst silt loam: 2,080 feet south and 525 feet east of the northwest corner, sec. 16, T. 13 S., R. 1 W.	82-IL-013-2-1	Ap	0-8	110	14	100	98	97	73	21	4	A-4(0)	CL-ML
	82-IL-013-2-5	2Bt2	26-32	97	22	100	100	100	92	56	36	A-7-6(36)	CH
Raddle silt loam: 600 feet north and 110 feet east of the southwest corner, sec. 7, T. 8 S., R. 3 W.	83-IL-013-22-1	Ap	0-7	107	16	100	100	100	98	24	4	A-4(3)	CL-ML
	83-IL-013-22-4	Bw2	27-40	111	16	100	100	99	97	27	7	A-4(6)	CL
	83-IL-013-22-5	BC	40-60	110	16	100	100	100	98	28	7	A-4(7)	CL

TABLE 19.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Beaucoup	Fine-silty, mixed, mesic Fluvaquentic Haplaquolls
Booker	Very fine, montmorillonitic, mesic Vertic Haplaquolls
*Drury	Fine-silty, mixed, mesic Dystric Eutrochrepts
Fayette	Fine-silty, mixed, mesic Typic Hapludalfs
Goss	Clayey-skeletal, mixed, mesic Typic Paleudalfs
Hamburg	Coarse-silty, mixed (calcareous), mesic Typic Udorthents
Haymond	Coarse-silty, mixed, nonacid, mesic Typic Udifluvents
Hurst	Fine, montmorillonitic, mesic Aeric Ochraqualfs
Lacrescent	Loamy-skeletal, mixed, mesic Typic Hapludolls
Oakville	Mixed, mesic Typic Udipsamments
Okaw	Fine, montmorillonitic, mesic Typic Albaqualfs
Orion	Coarse-silty, mixed, nonacid, mesic Aquic Udifluvents
*Raddle	Fine-silty, mixed, mesic Typic Hapludolls
Rozetta	Fine-silty, mixed, mesic Typic Hapludalfs
Sarpy	Mixed, mesic Typic Udipsamments
Seaton	Fine-silty, mixed, mesic Typic Hapludalfs
*Sogn	Loamy, mixed, mesic Lithic Haplustolls
Stronghurst	Fine-silty, mixed, mesic Aeric Ochraqualfs
Sylvan	Fine-silty, mixed, mesic Typic Hapludalfs
Tice	Fine-silty, mixed, mesic Fluvaquentic Hapludolls
Wakeland	Coarse-silty, mixed, nonacid, mesic Aeric Fluvaquents

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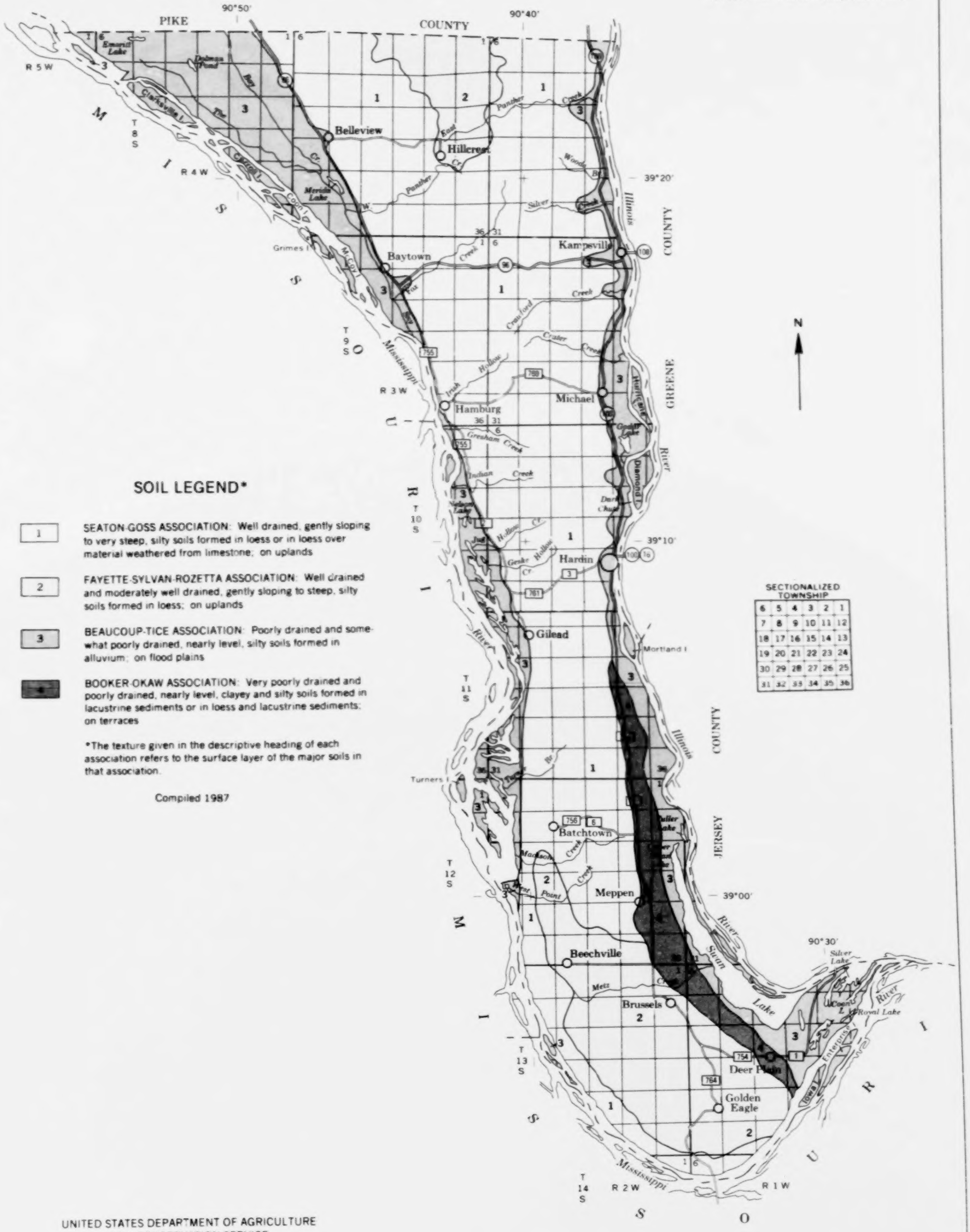
MAPS

TRANSPOSED TO

END OF VOLUME

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



SOIL LEGEND*

1	**SEATON-GOSS ASSOCIATION:** Well drained, gently sloping to very steep, silty soils formed in loess or in loess over material weathered from limestone; on uplands
2	**FAYETTE-SYLVAN-ROZETTA ASSOCIATION:** Well drained and moderately well drained, gently sloping to steep, silty soils formed in loess; on uplands
3	**BEAUCOUP-TICE ASSOCIATION:** Poorly drained and somewhat poorly drained, nearly level, silty soils formed in alluvium; on flood plains
4	**BOOKER-OKAW ASSOCIATION:** Very poorly drained and poorly drained, nearly level, clayey and silty soils formed in lacustrine sediments or in loess and lacustrine sediments; on terraces

*The texture given in the descriptive heading of each association refers to the surface layer of the major soils in that association.

Compiled 1987

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ILLINOIS AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP
CALHOUN COUNTY, ILLINOIS

Scale 1:190,080

1 0 1 2 3 Miles

1 0 3 6 Km

SOIL LEGEND

Map symbols consist of numbers or a combination of numbers and a letter. The initial numbers represent the kind of soil. A capital letter following these numbers indicates the class of slope. Symbols without a slope letter are for nearly level soils or miscellaneous areas. A final number of 2 following the slope letter indicates that the soil is eroded and 3 that it is severely eroded.

SYMBOL	NAME
19D2	Sylvan silt loam, 10 to 15 percent slopes, eroded
19D3	Sylvan silty clay loam, 10 to 15 percent slopes, severely eroded
19F3	Sylvan silty clay loam, 15 to 30 percent slopes, severely eroded
30G	Hamburg silt loam, 30 to 65 percent slopes
70	Beaucoup silty clay loam
75B	Drury silt, 2 to 5 percent slopes
75C	Drury silt, 5 to 10 percent slopes
84	Okaw silty clay loam
92	Sarpy sand
274B	Seaton silt, 2 to 5 percent slopes
274C2	Seaton silt loam, 5 to 10 percent slopes, eroded
274D2	Seaton silt loam, 10 to 18 percent slopes, eroded
274F	Seaton silt, 18 to 30 percent slopes
274F3	Seaton silt loam, 18 to 30 percent slopes, severely eroded
274G	Seaton silt, 30 to 60 percent slopes
278A	Stronghurst silt loam, 0 to 3 percent slopes
279C2	Rozetta silt loam, 4 to 10 percent slopes, eroded
279D3	Rozetta silty clay loam, 10 to 15 percent slopes, severely eroded
280B	Fayette silt loam, 1 to 5 percent slopes
280C2	Fayette silt loam, 5 to 10 percent slopes, eroded
280D2	Fayette silt loam, 10 to 18 percent slopes, eroded
284	Tice silt loam
331	Haymond silt
333	Wakeland silt loam
338	Hurst silt loam
415	Orion silt loam
430B	Raddle silt loam, 1 to 5 percent slopes
457	Booker clay
504G	Sogn flaggy silt loam, 30 to 65 percent slopes
580D3	Fayette silty clay loam, karst, 5 to 15 percent slopes, severely eroded
606F	Goss cherty silt loam, 15 to 30 percent slopes
606G	Goss cherty silt loam, 30 to 70 percent slopes
741A	Oakville loamy fine sand, loamy substratum, 0 to 3 percent slopes
741D2	Oakville loamy fine sand, loamy substratum, 10 to 15 percent slopes, eroded
785G	Lacrescent very flaggy silt loam, 30 to 70 percent slopes
864	Pits, quarries
1070	Beaucoup silty clay loam, wet

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Reservation (wildlife refuge)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections)

ROADS

- Other roads

ROAD EMBLEMS & DESIGNATIONS

- State

LEVEES

- Without road

DAMS

- Medium or small

PITS

- Mine or quarry

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end

Canals or ditches

- Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

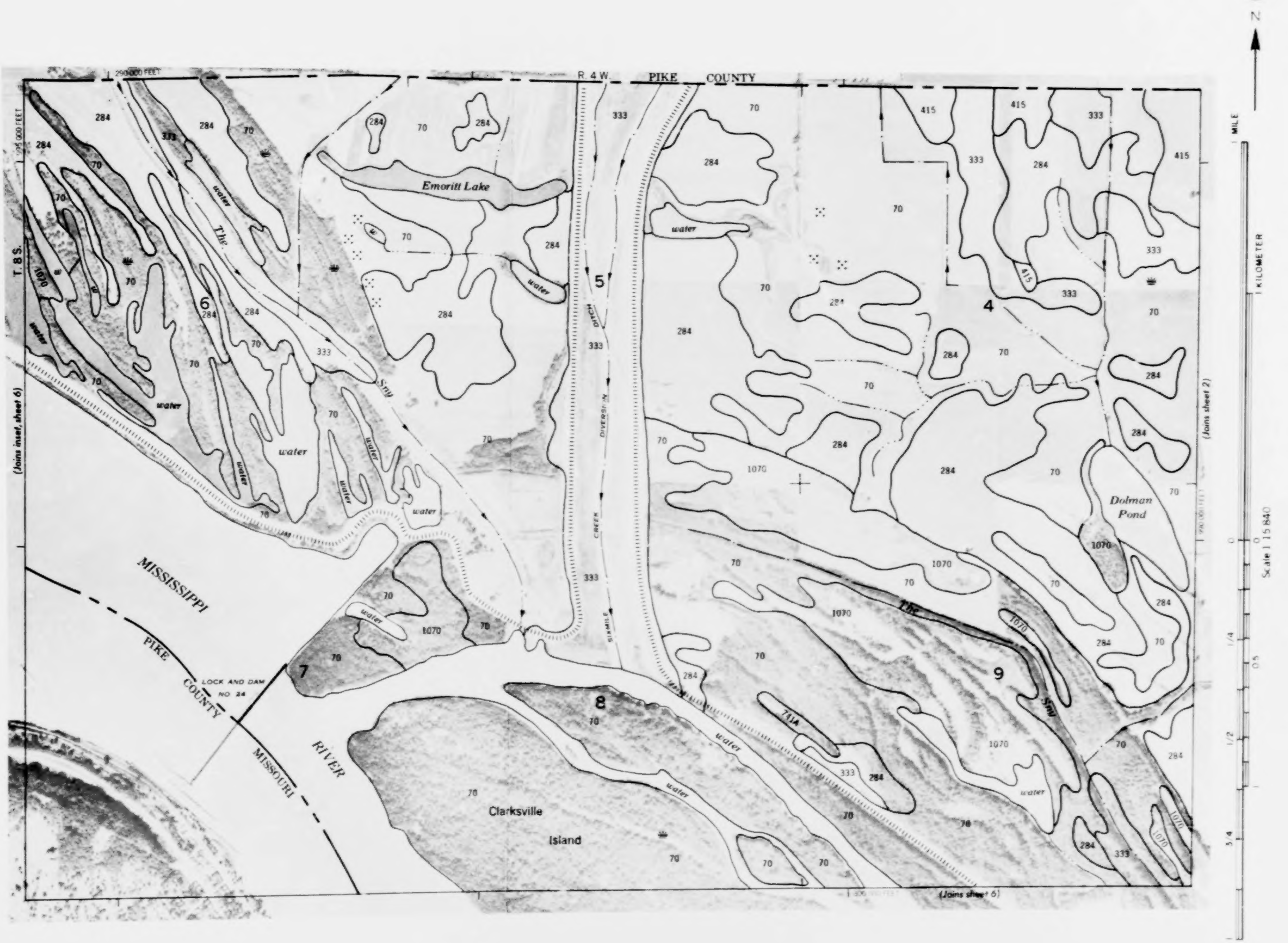
DEPRESSION OR SINK

SOIL SAMPLE SITE

MISCELLANEOUS

- Gravelly spot
- Rock outcrop
- Sandy spot
- Severely eroded spot
- Calcareous spot
- Spot of silty alluvial soil in depressions

SOIL MAP OF CALHOUN COUNTY, ILLINOIS — SHEET NUMBER 1



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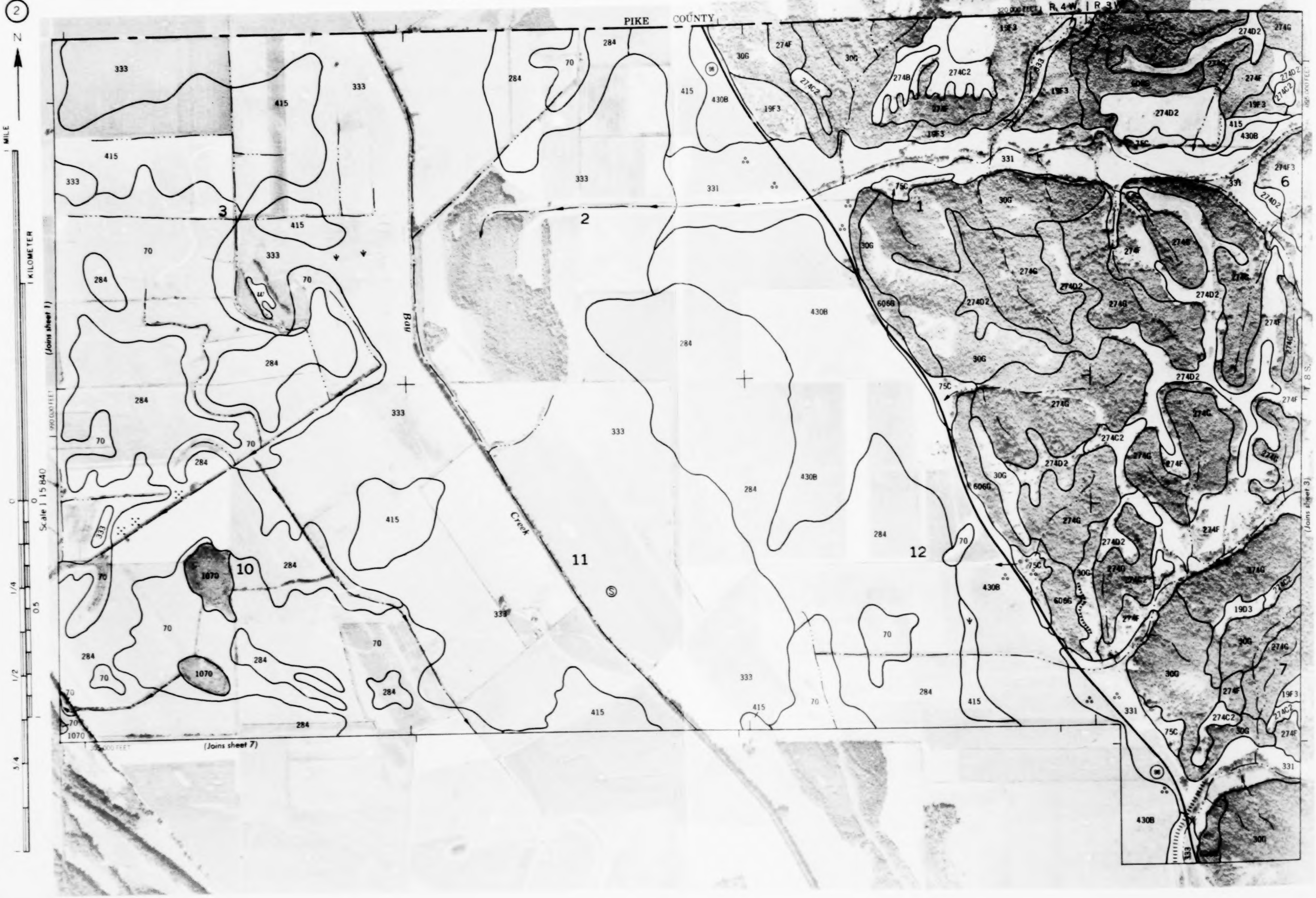

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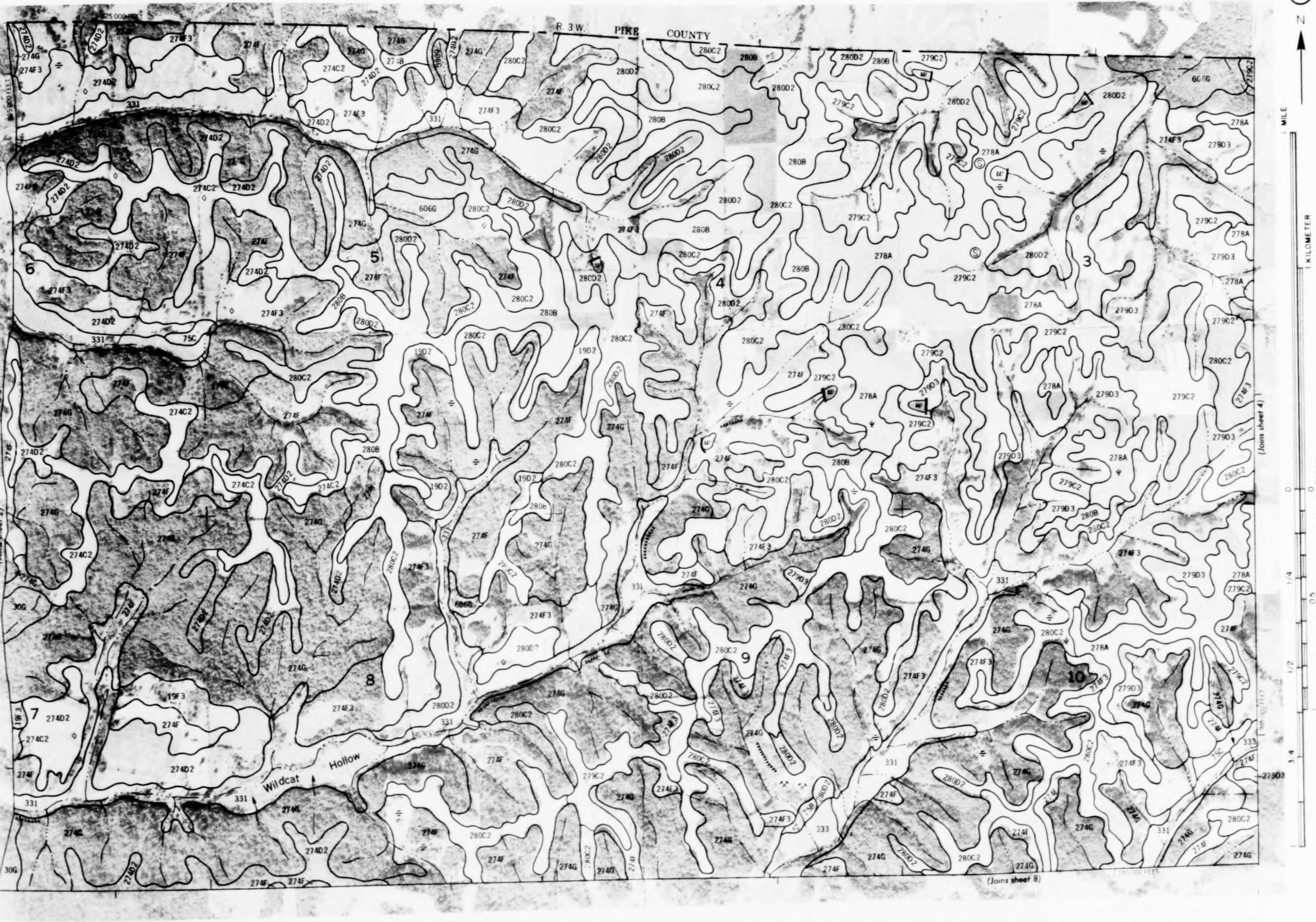

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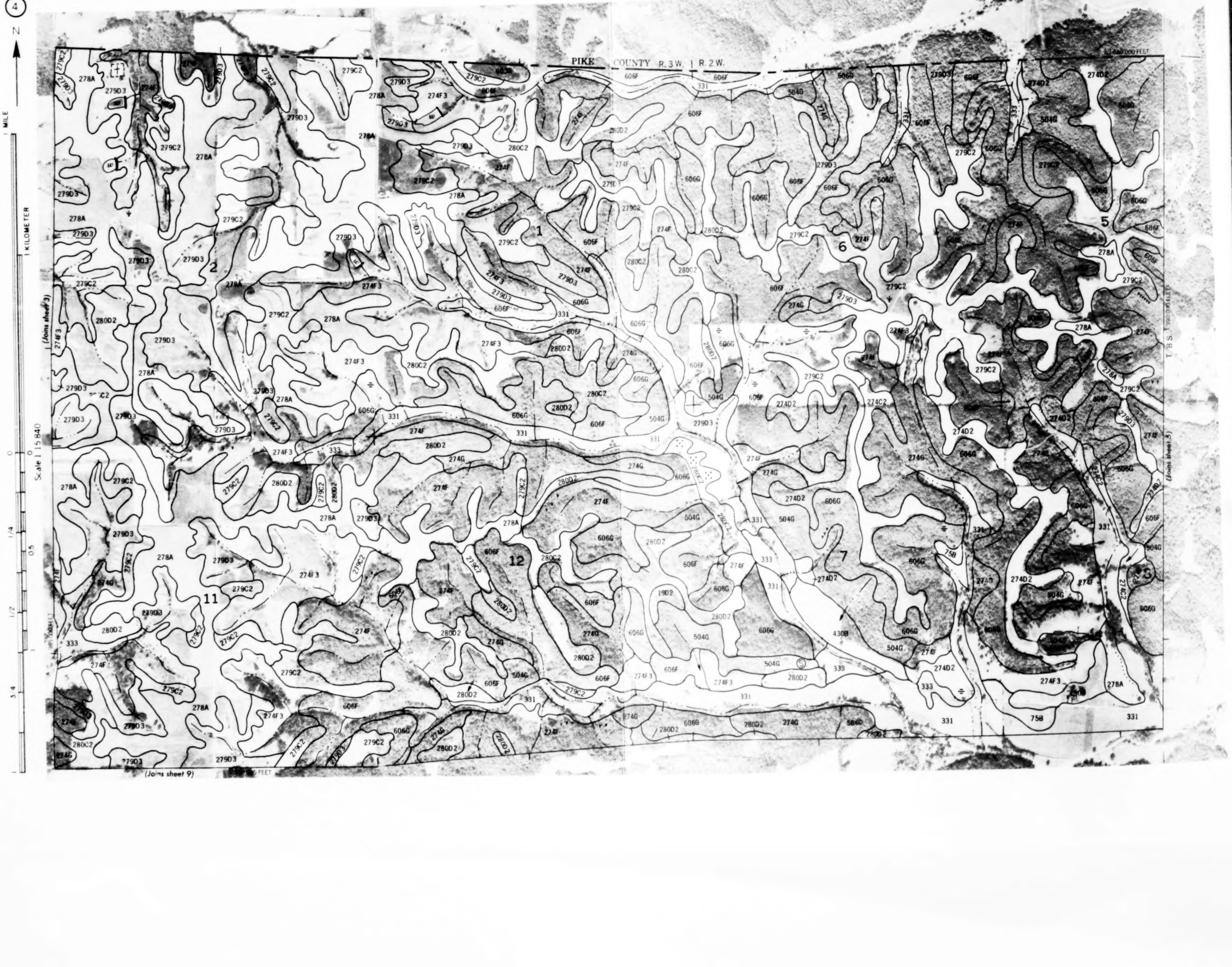

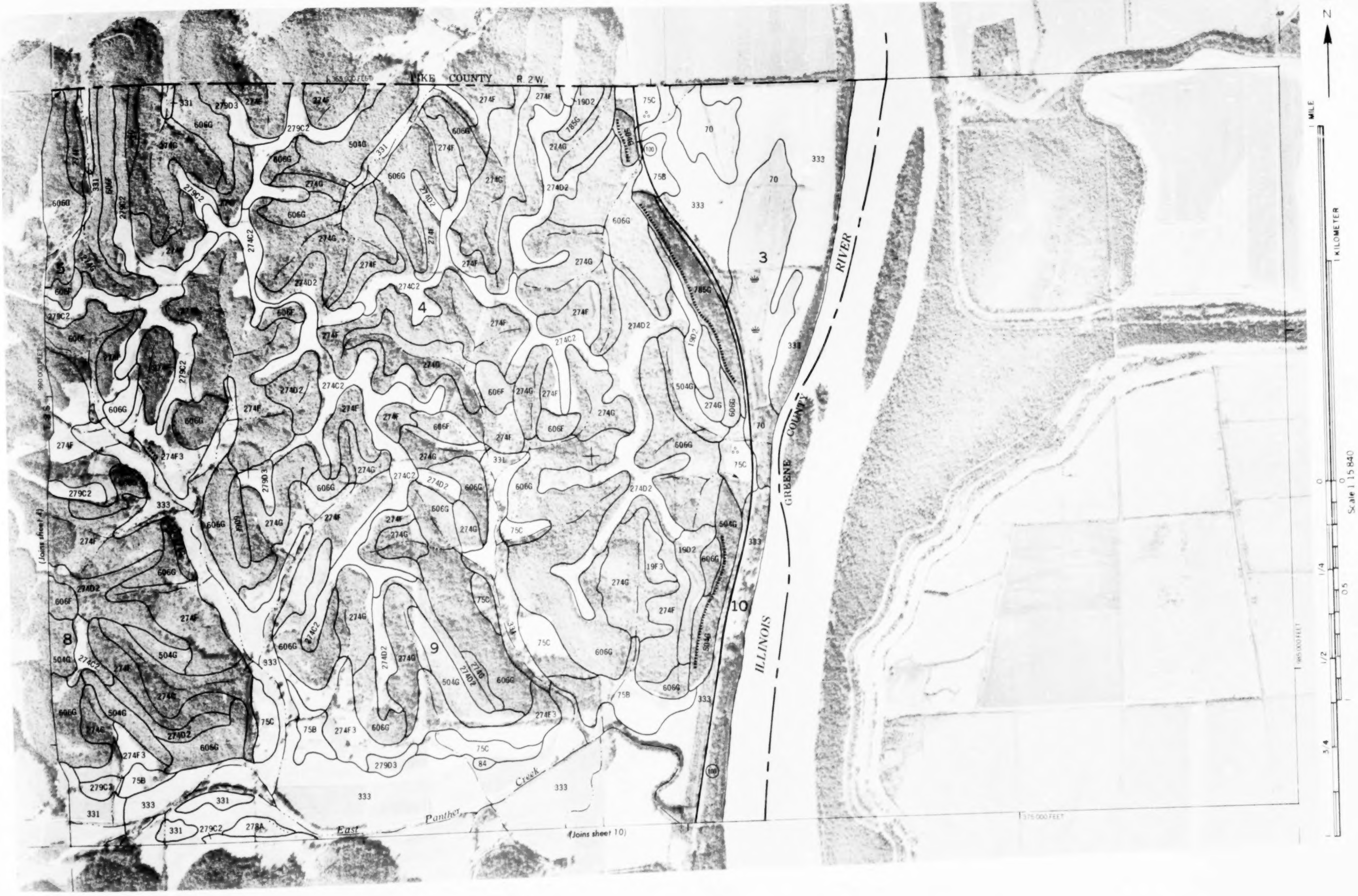

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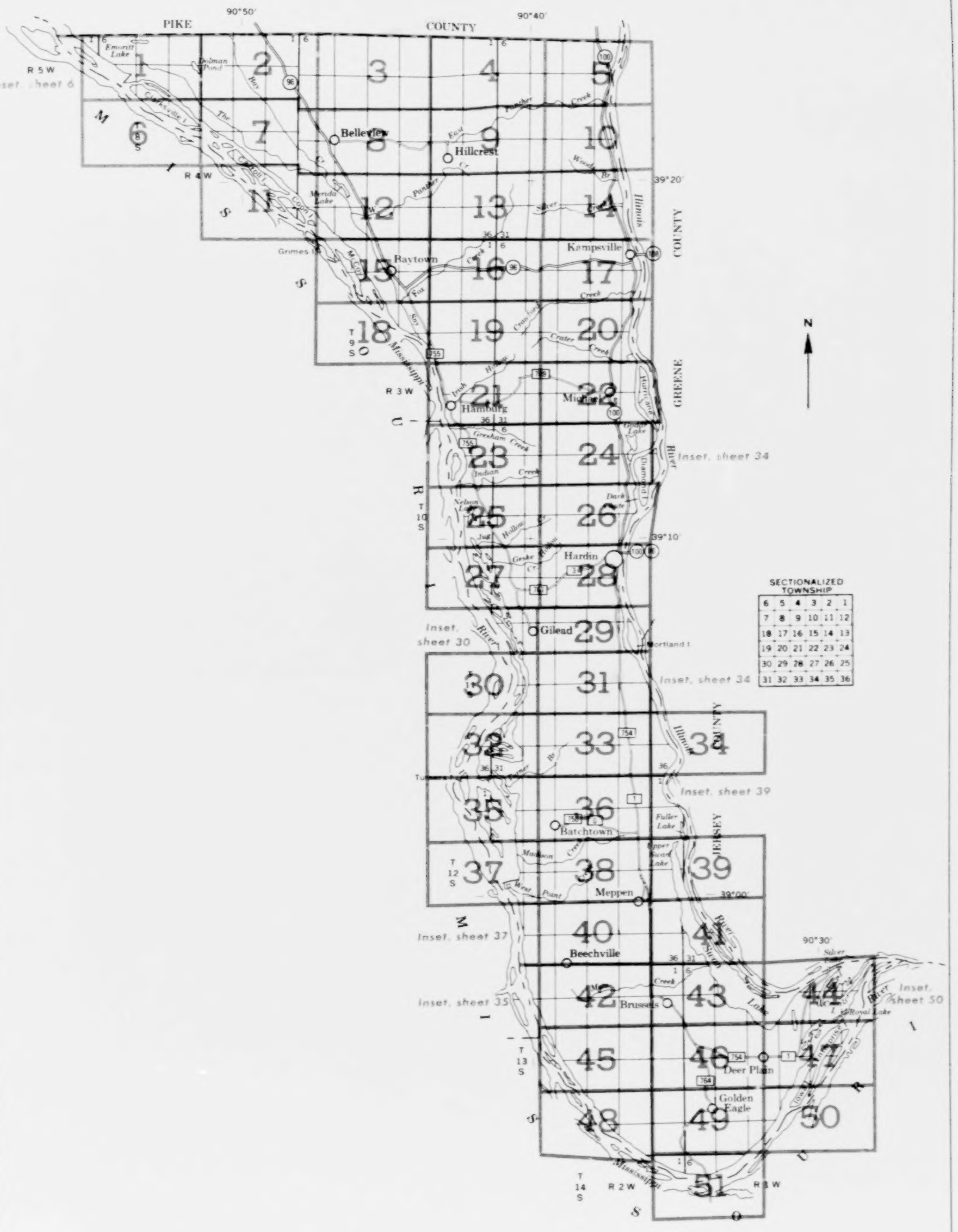

INDEX TO MAP SHEETS

CALHOUN COUNTY, ILLINOIS

Scale 1:190,080

1 0 1 2 3 Miles

1 0 3 6 Km

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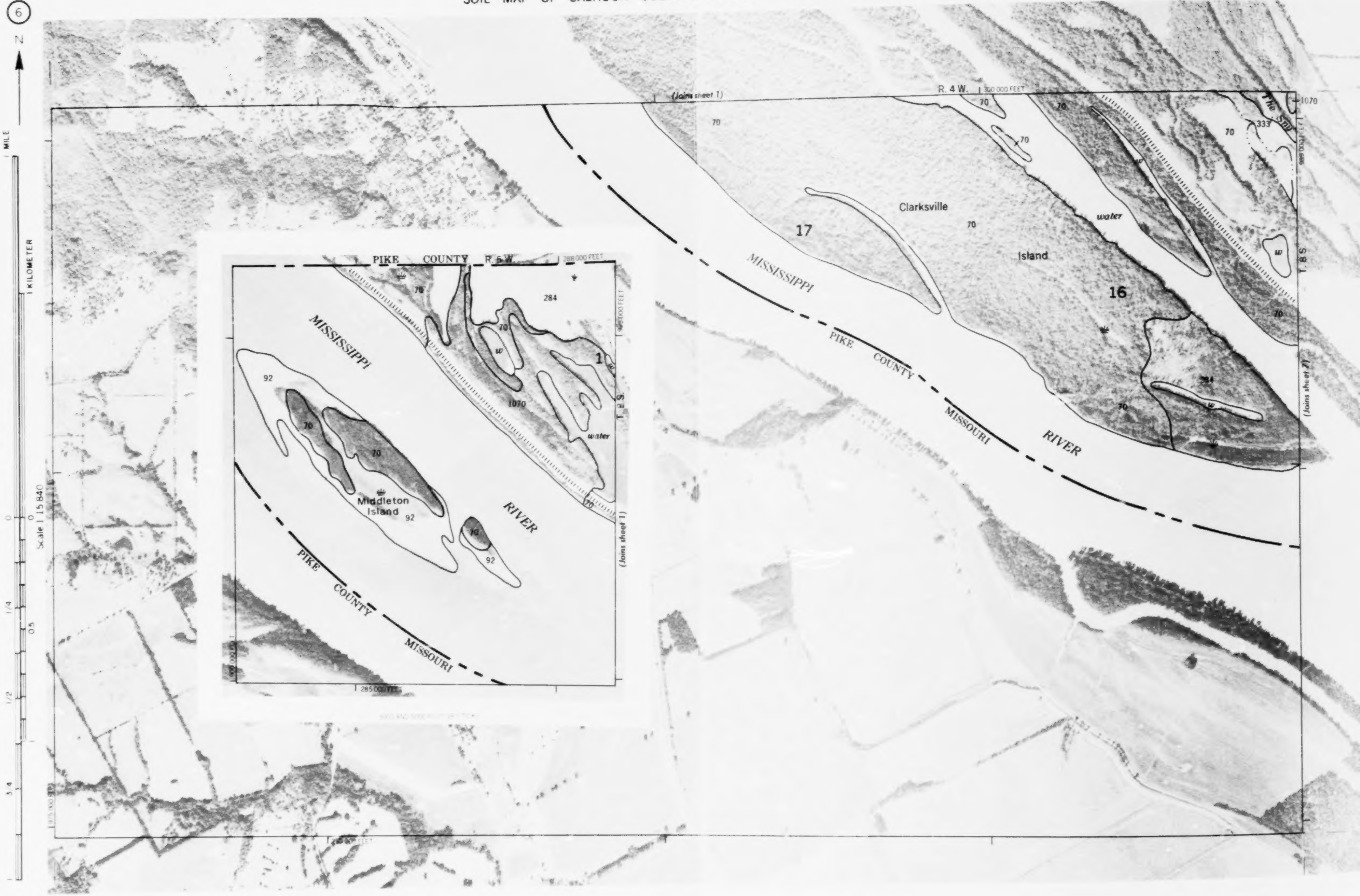
SOIL MAP OF CALHOUN COUNTY, ILLINOIS — SHEET NUMBER 6



SOIL MAP OF CALHOUN COUNTY, ILLINOIS — SHEET NUMBER 7

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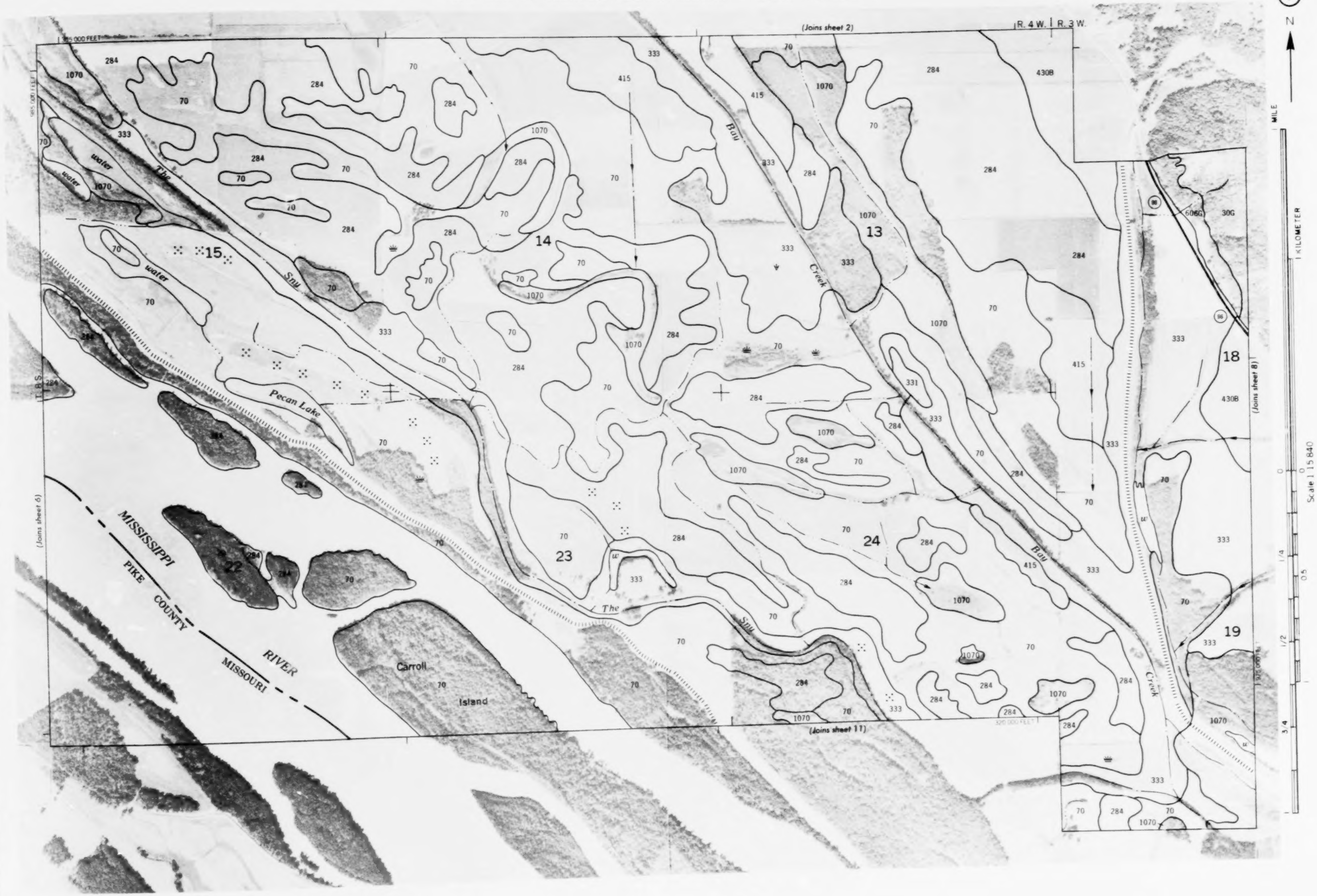

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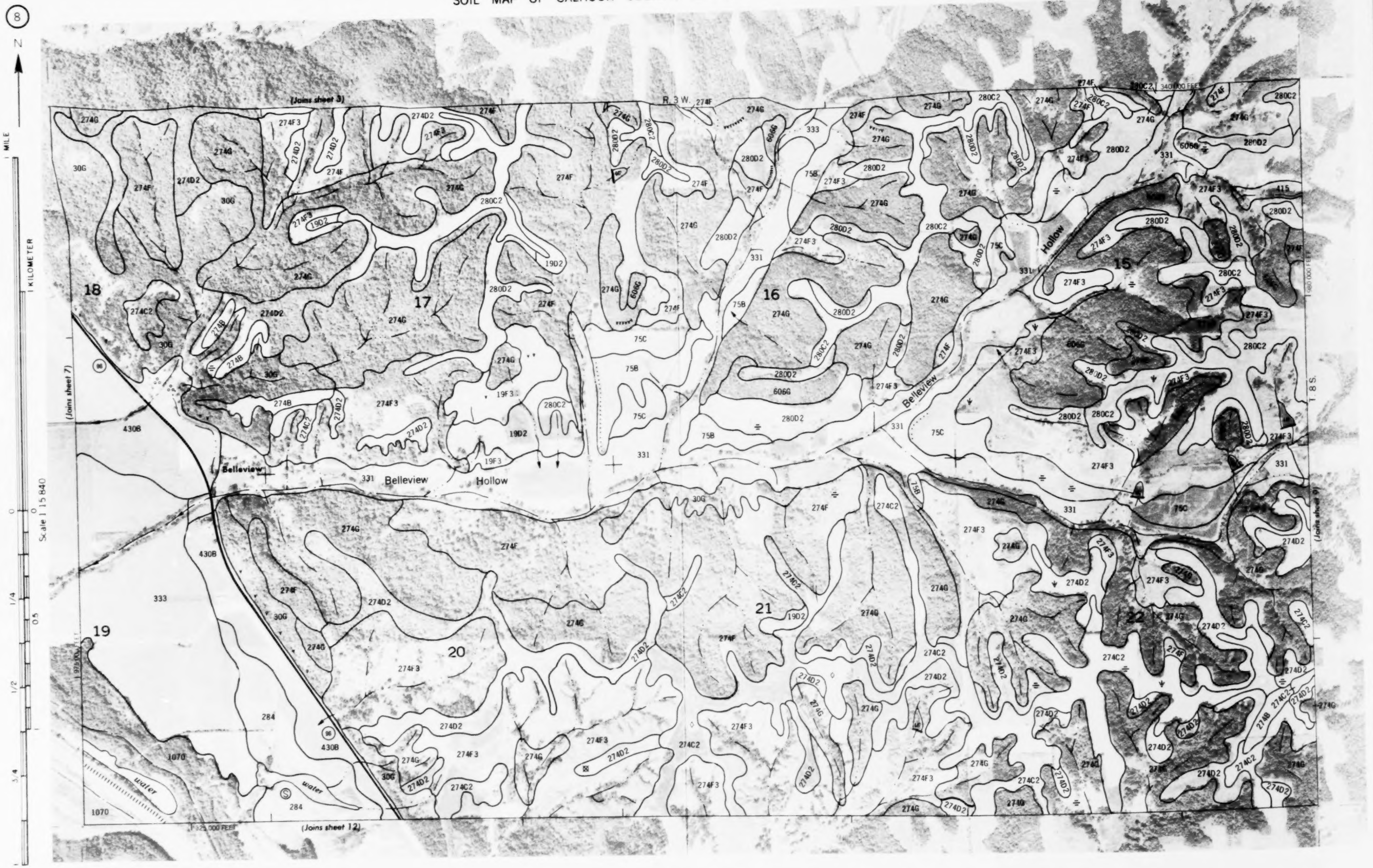

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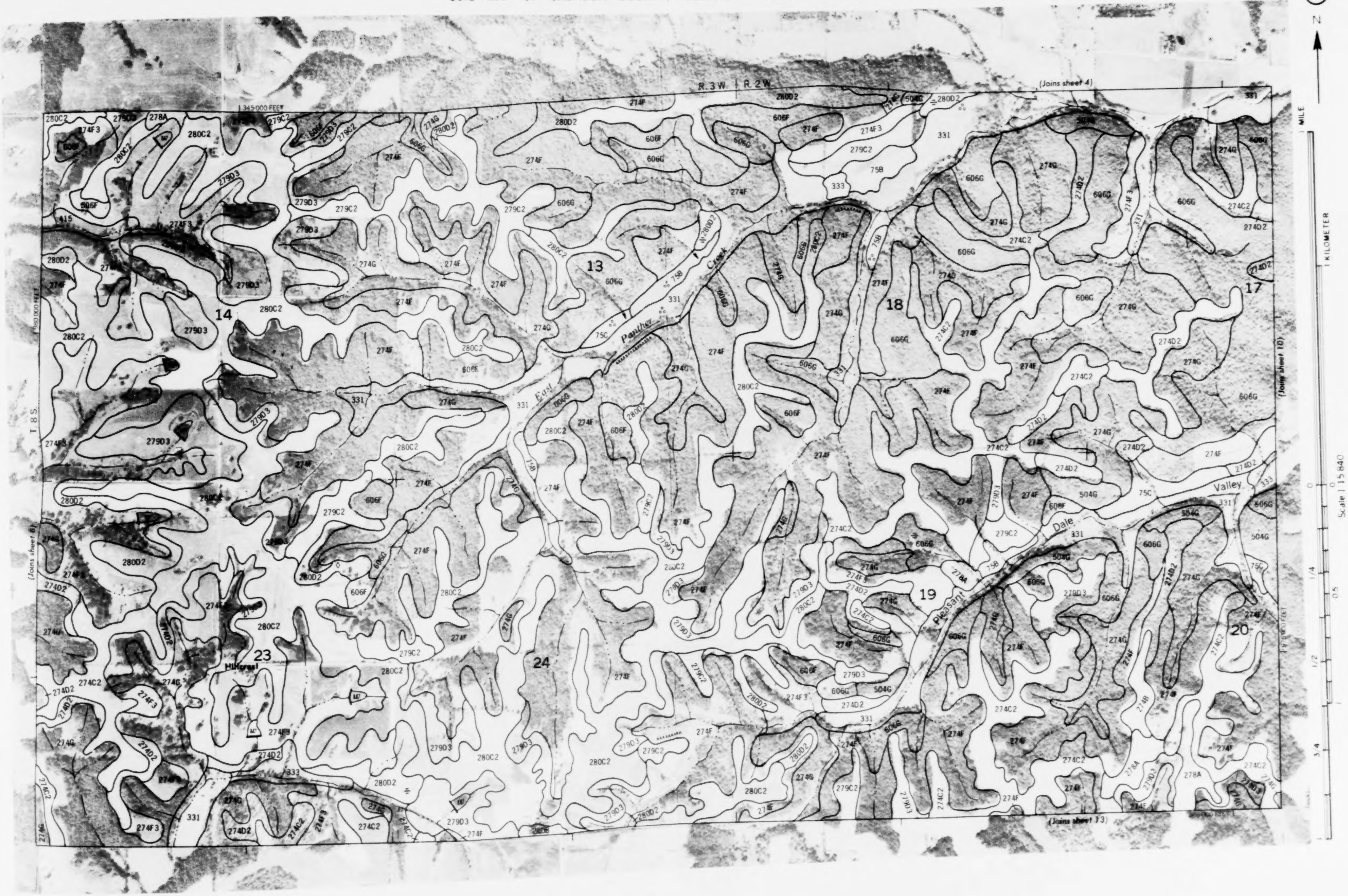

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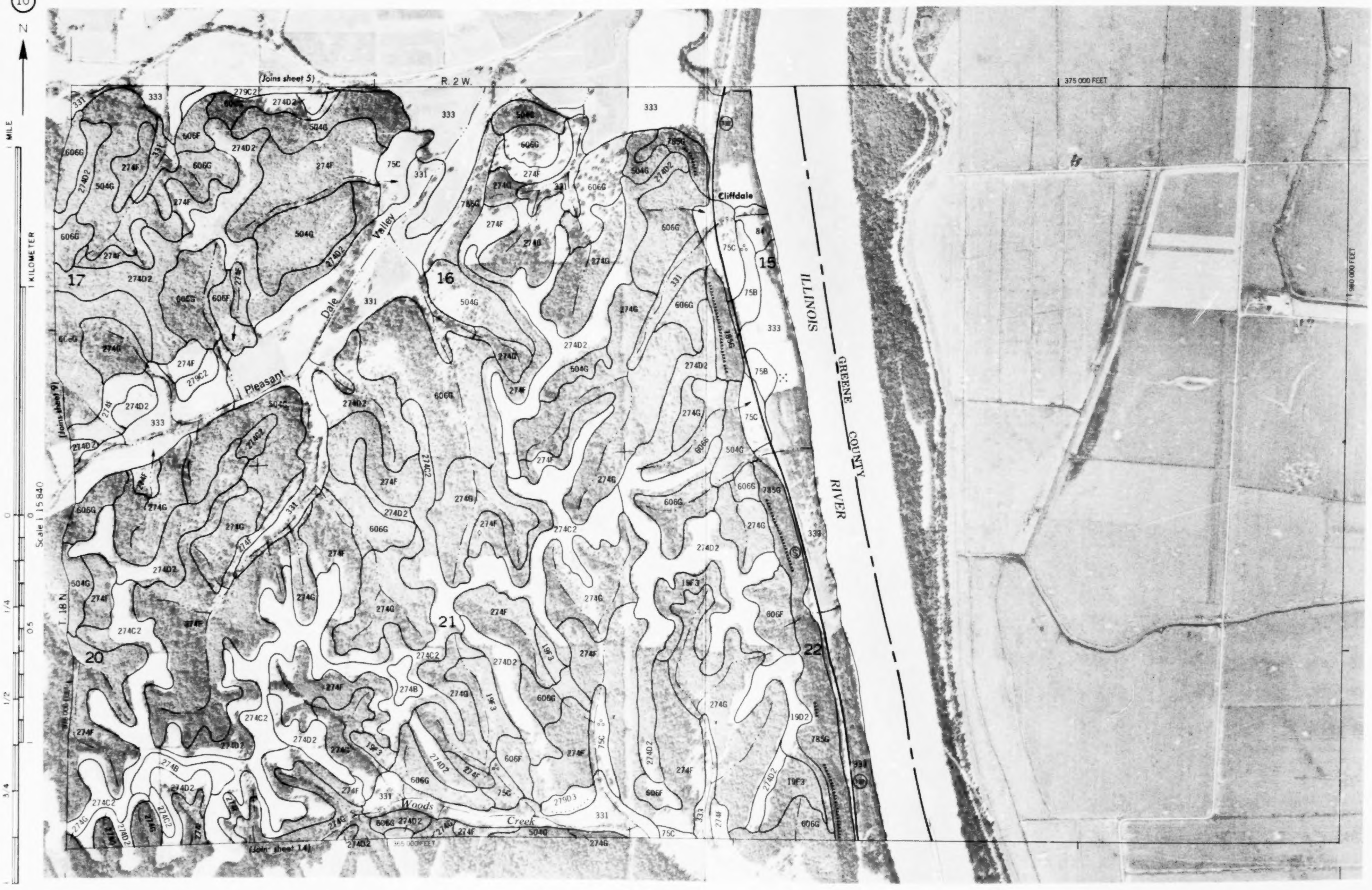

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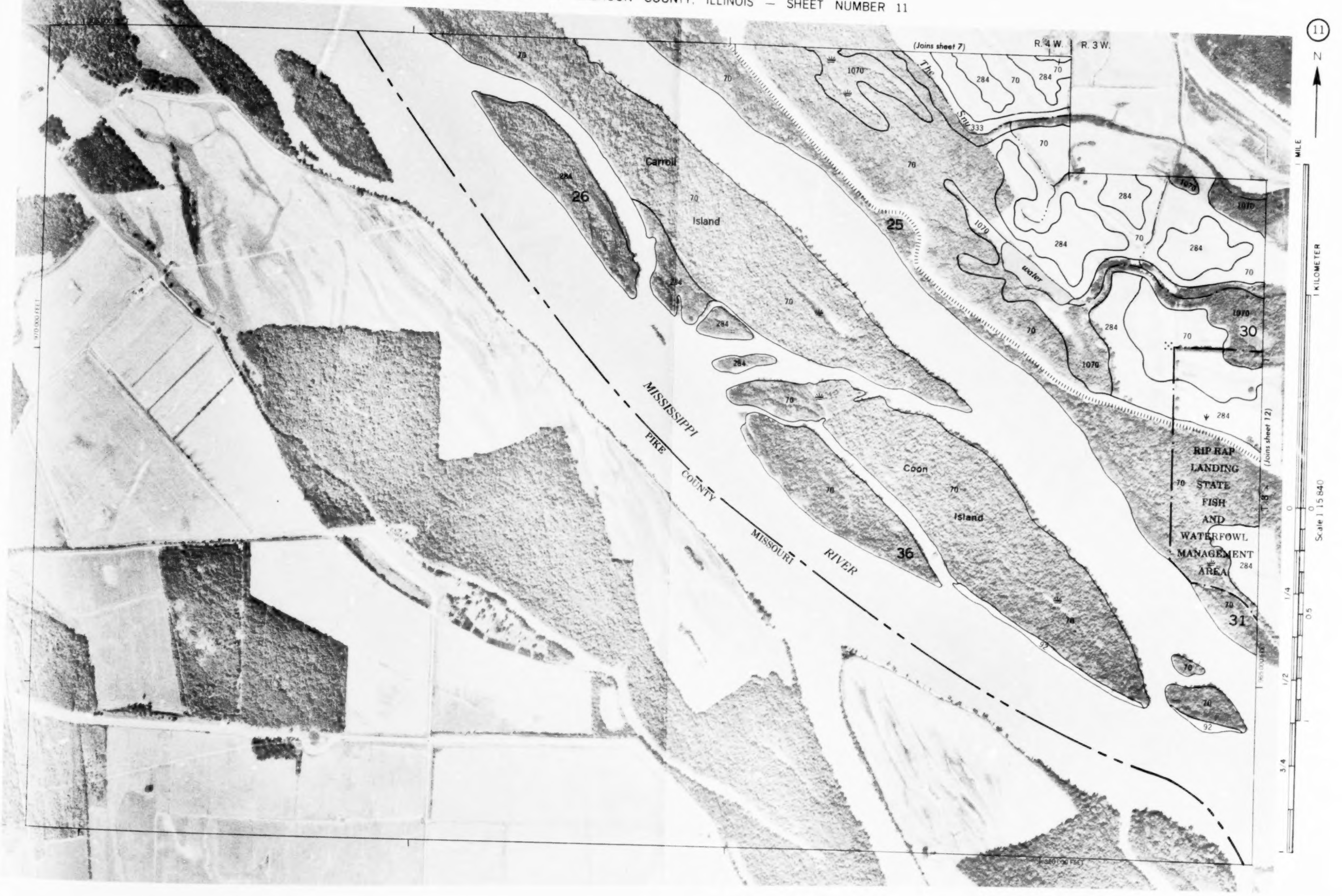

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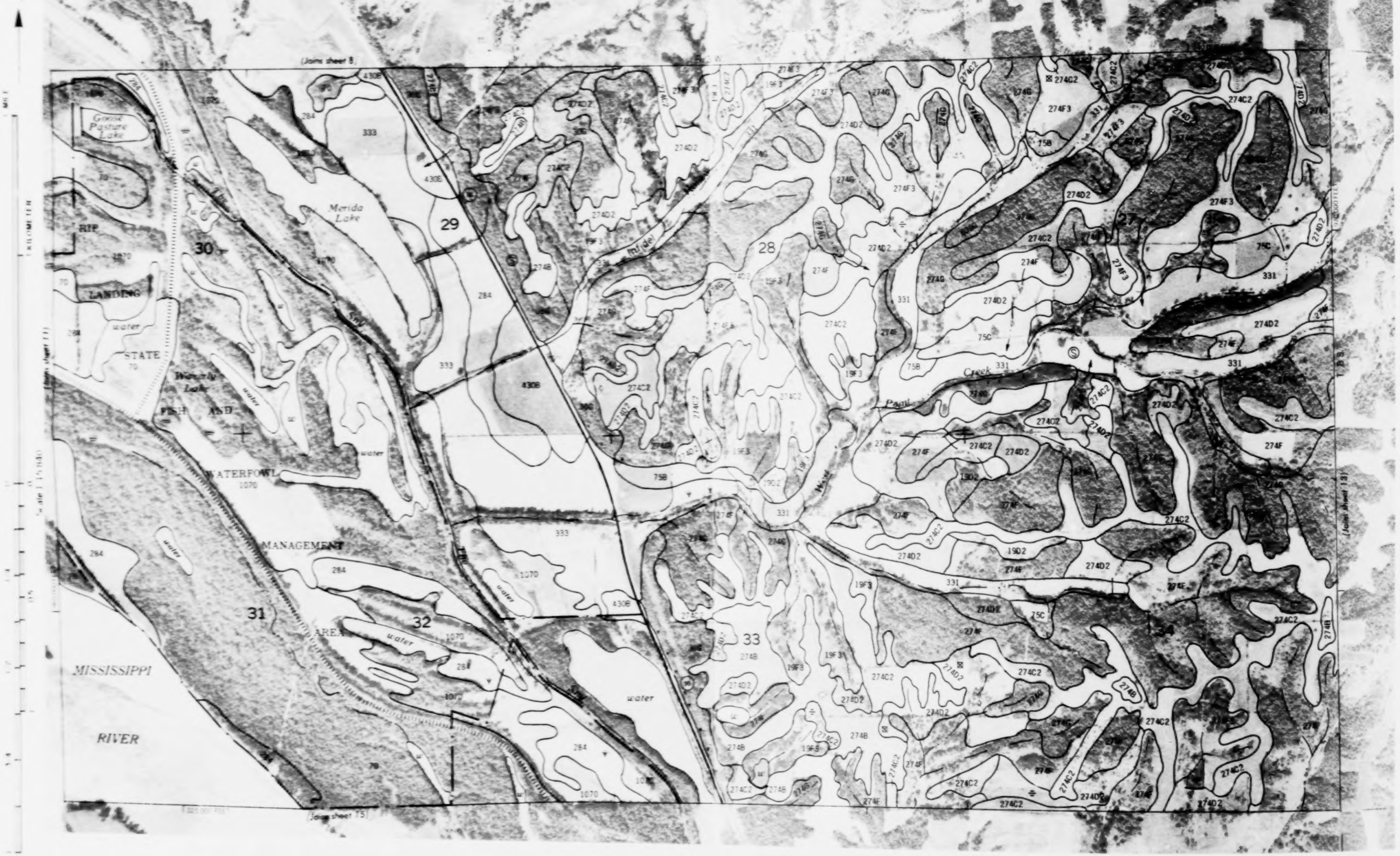

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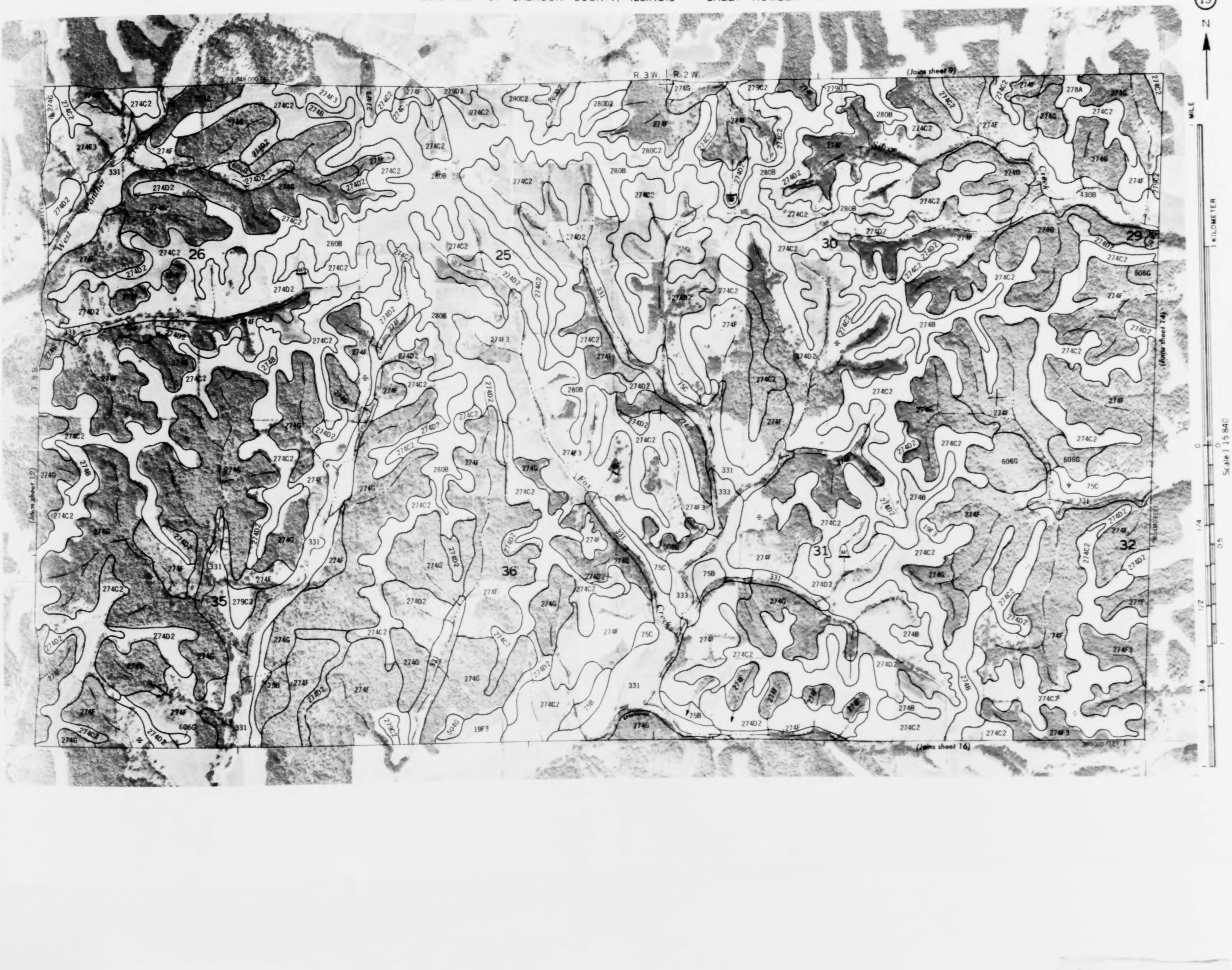

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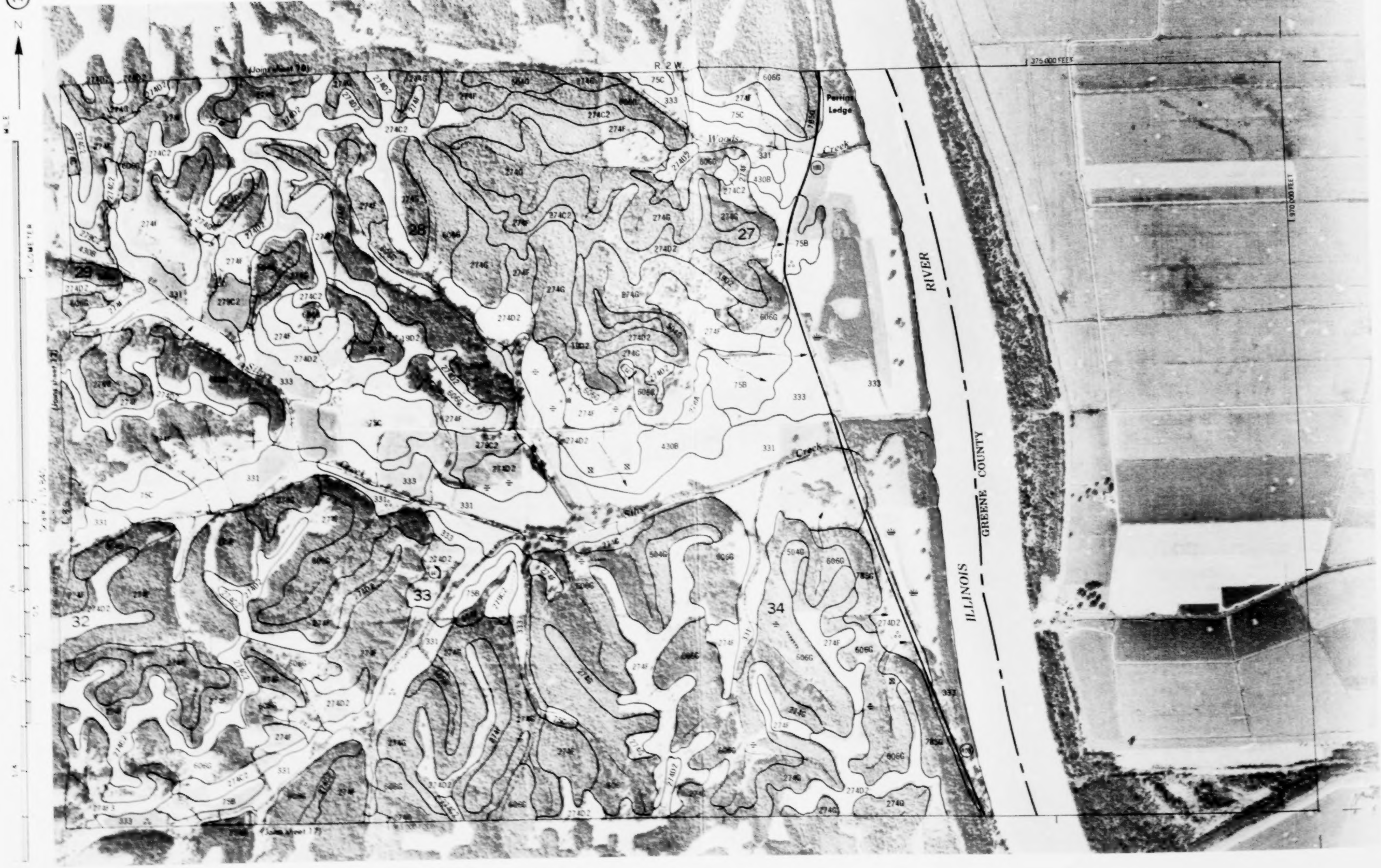

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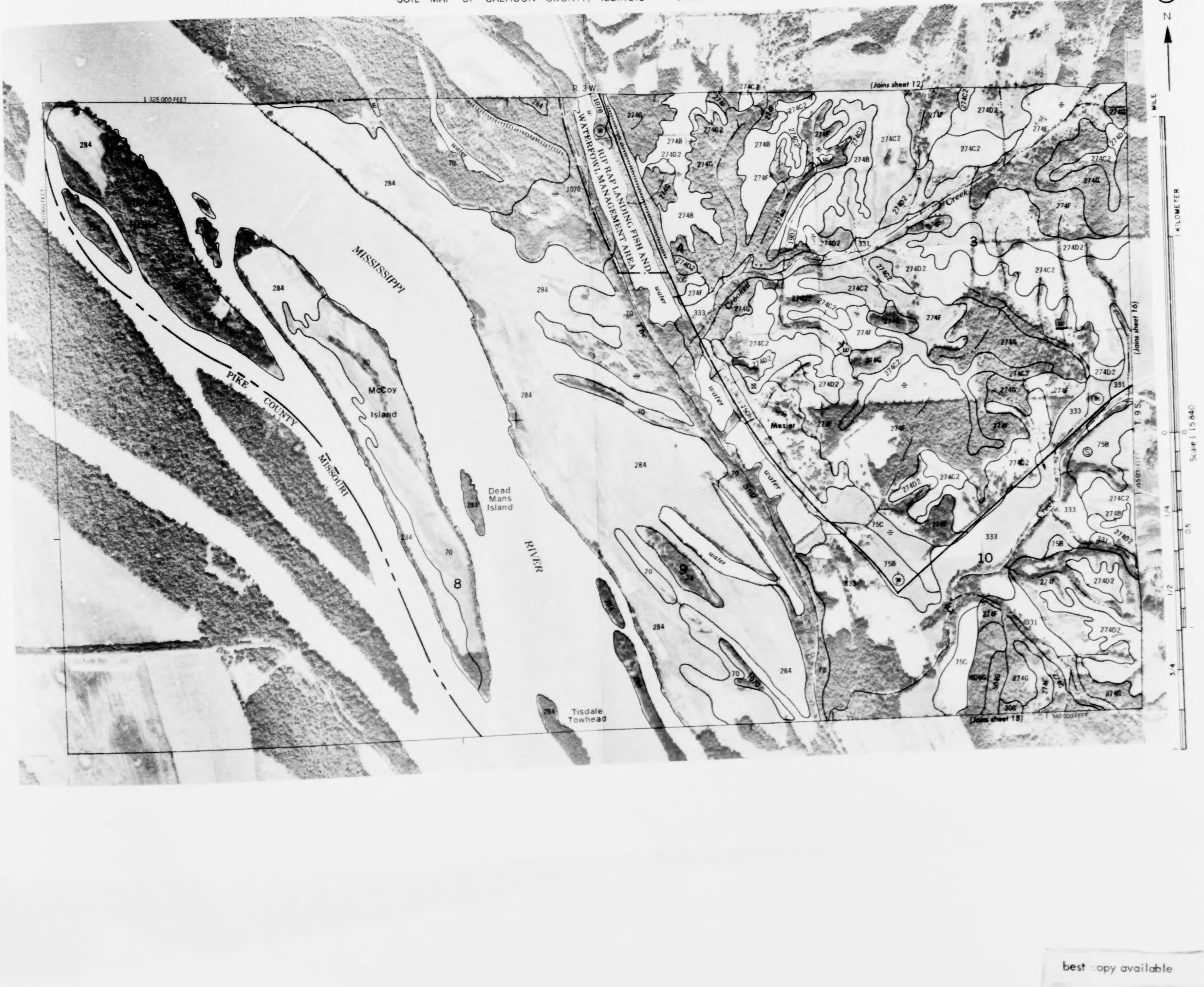

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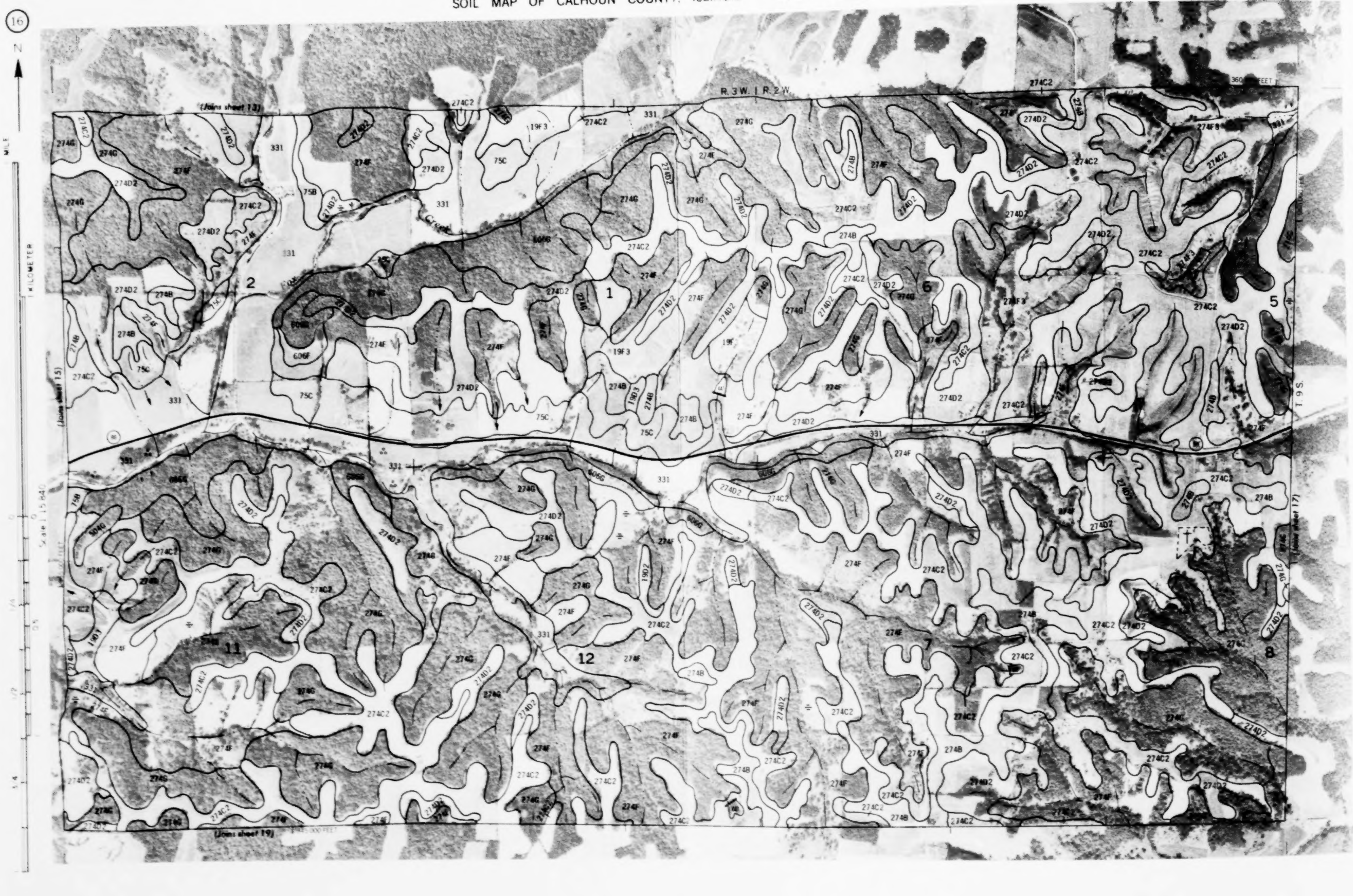

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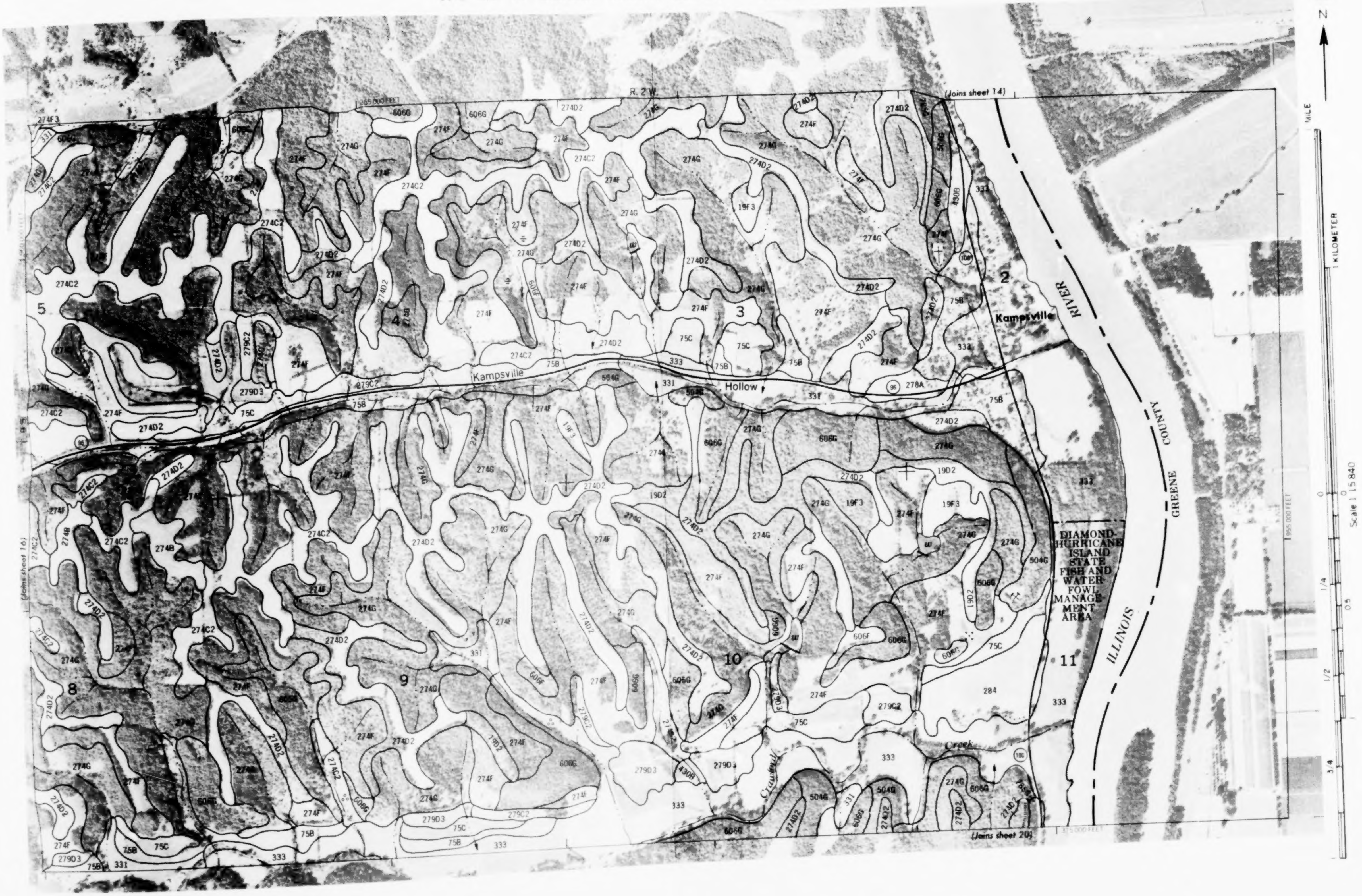

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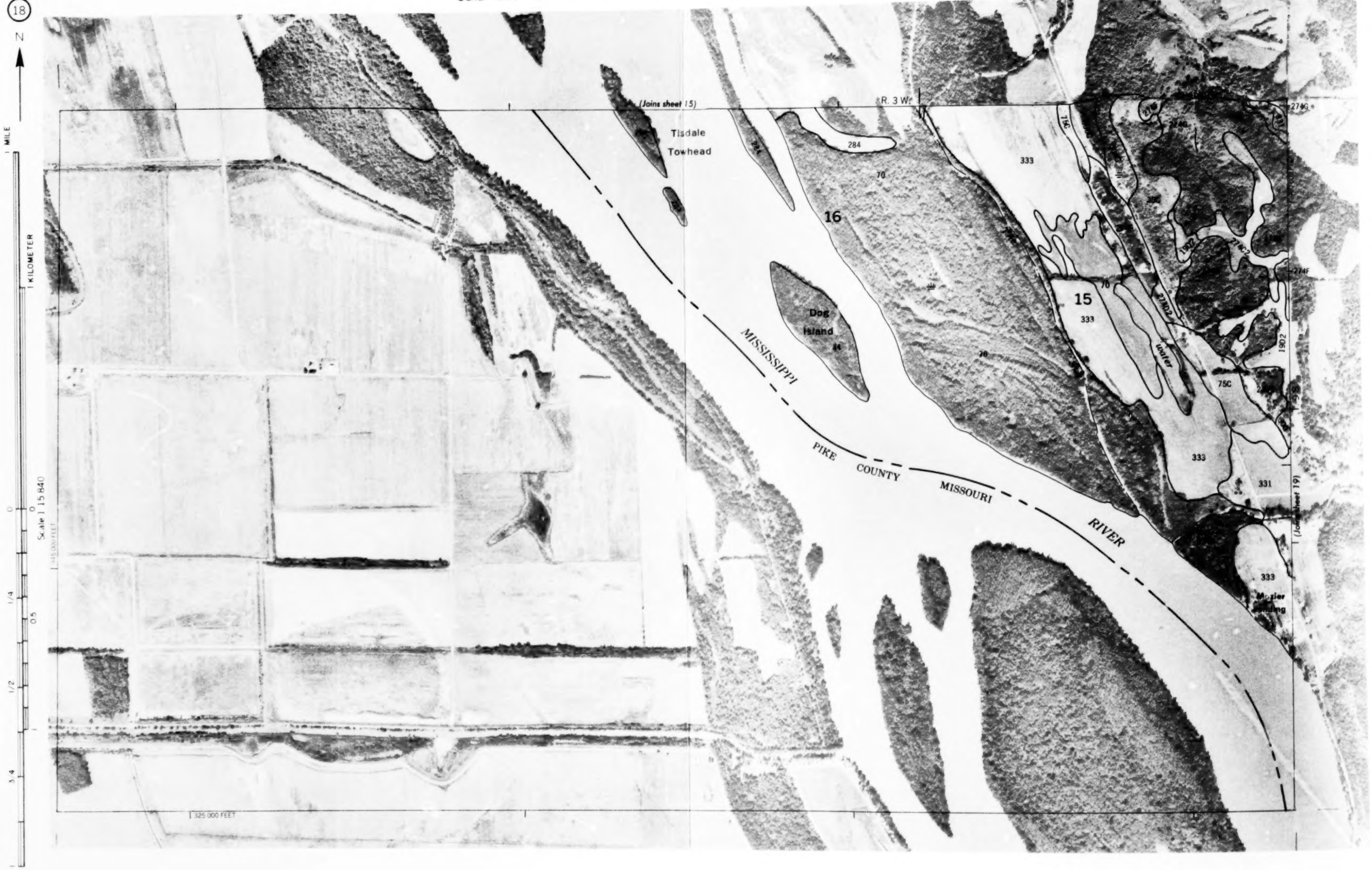

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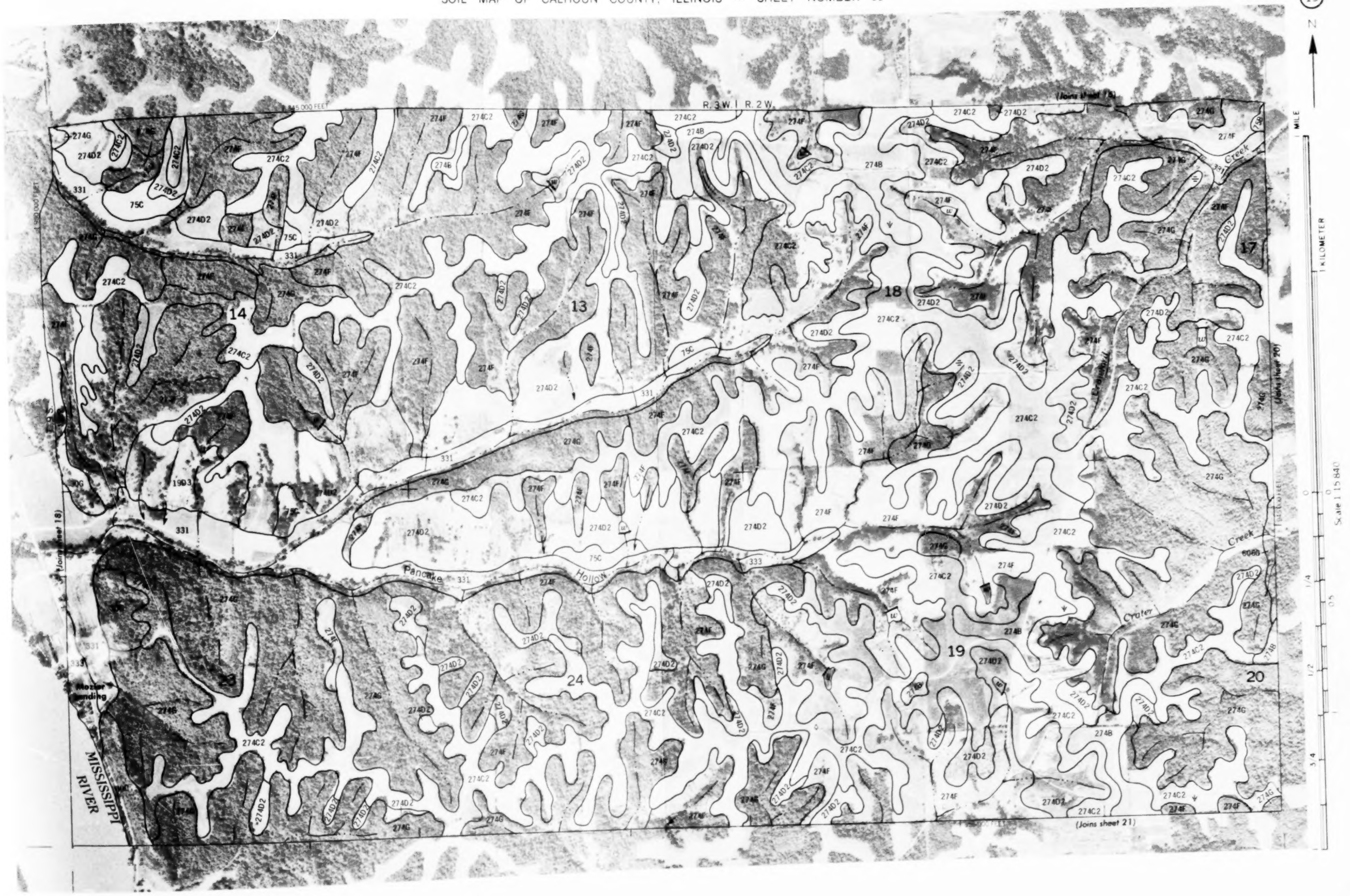

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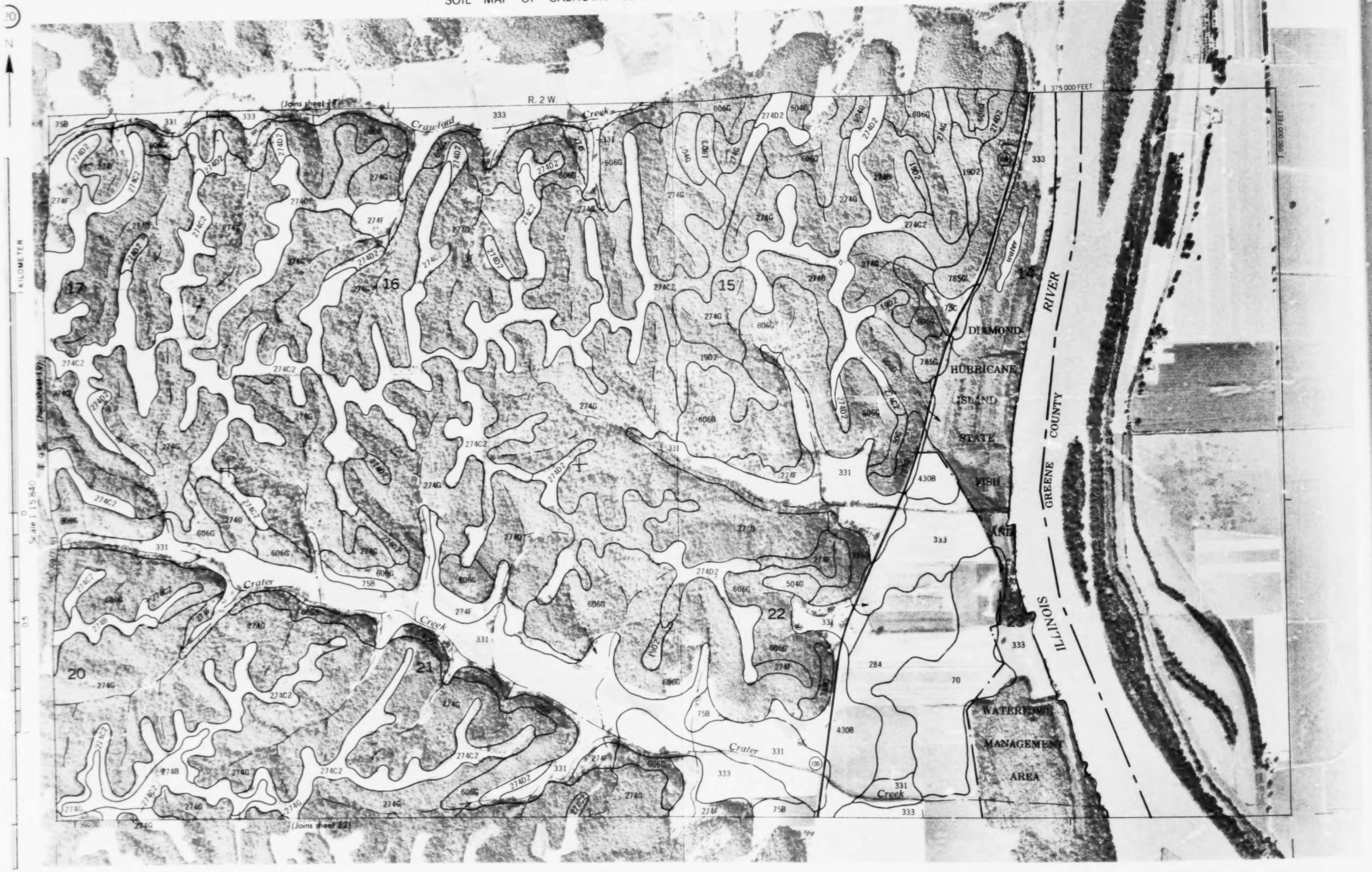

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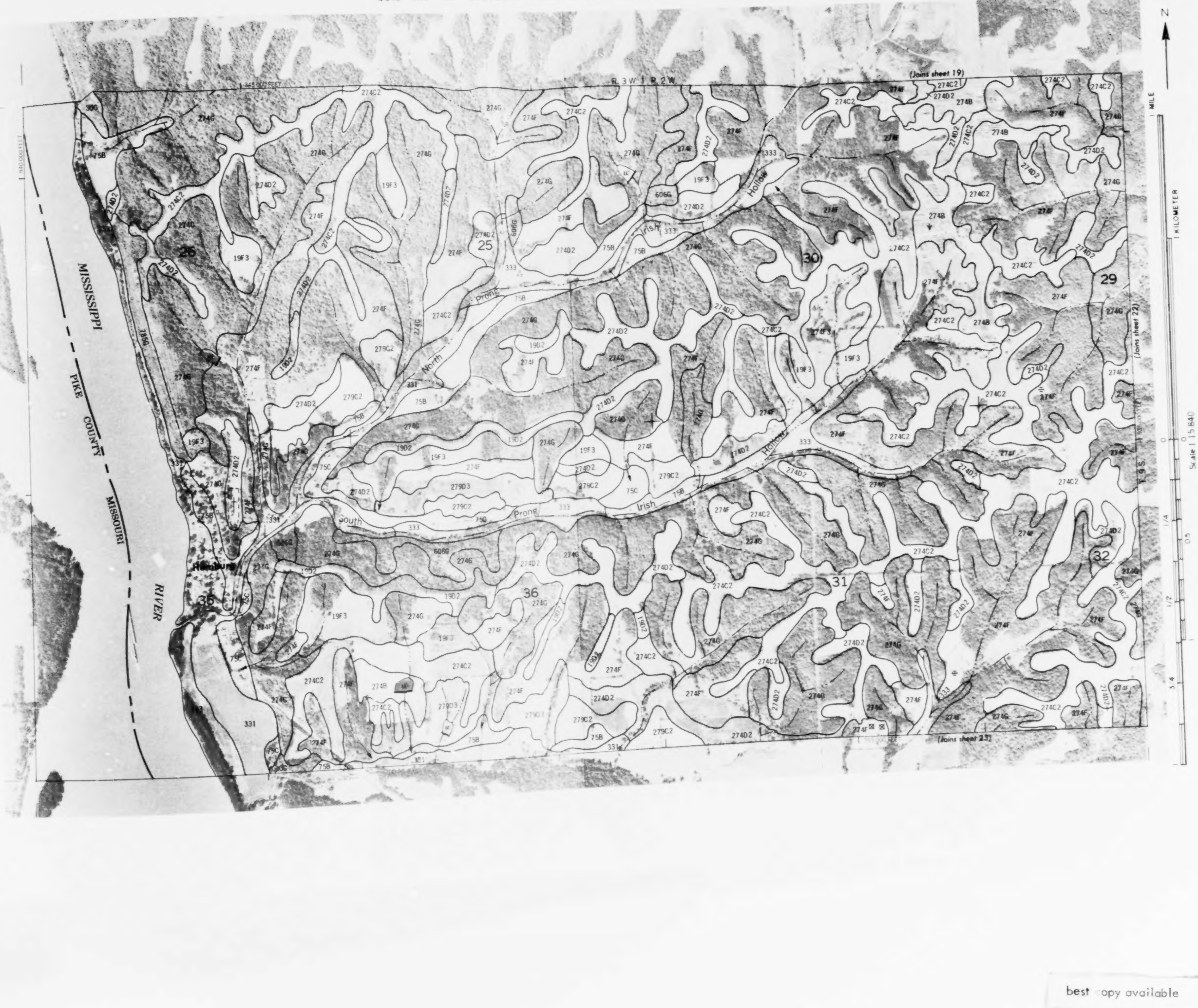

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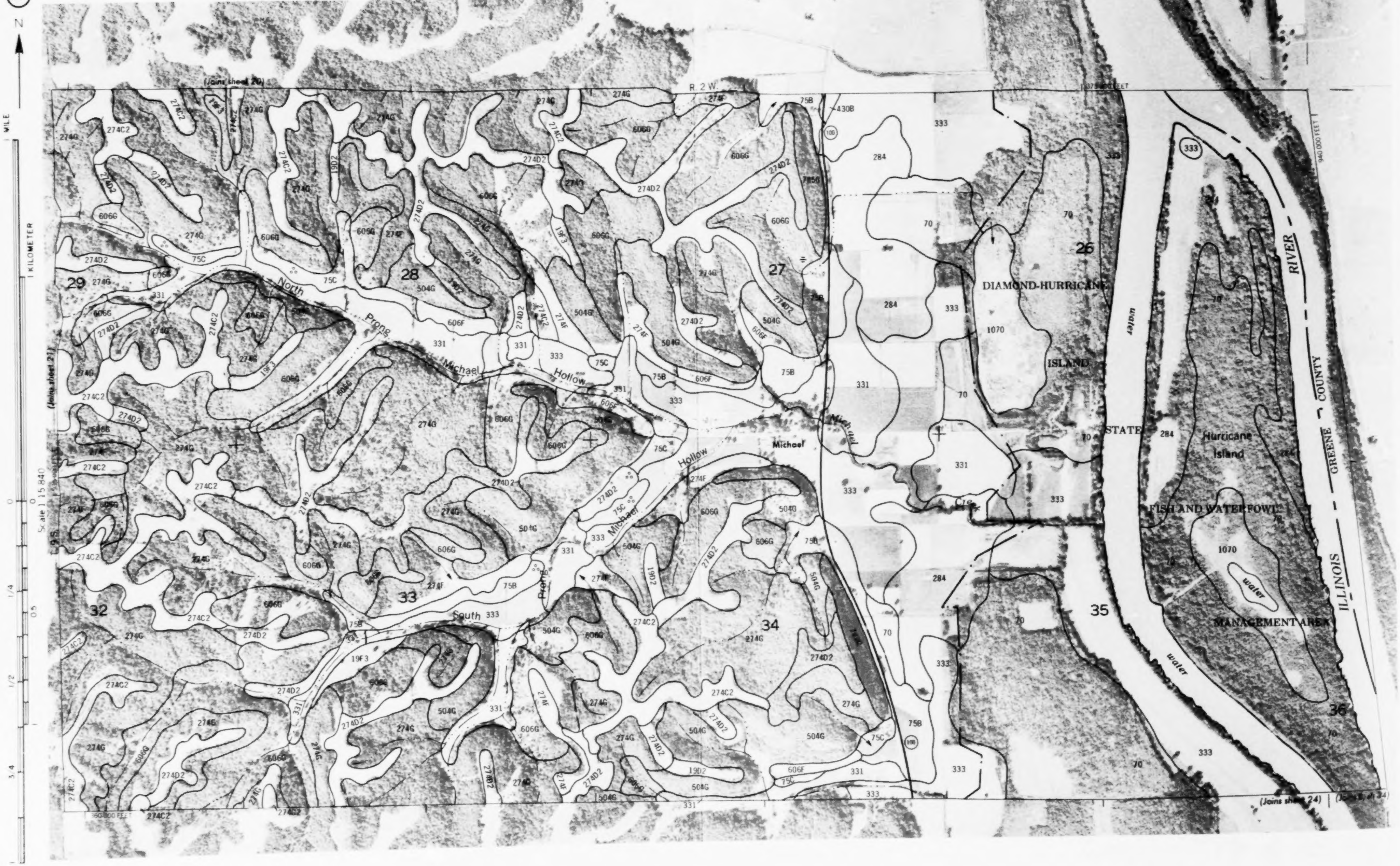

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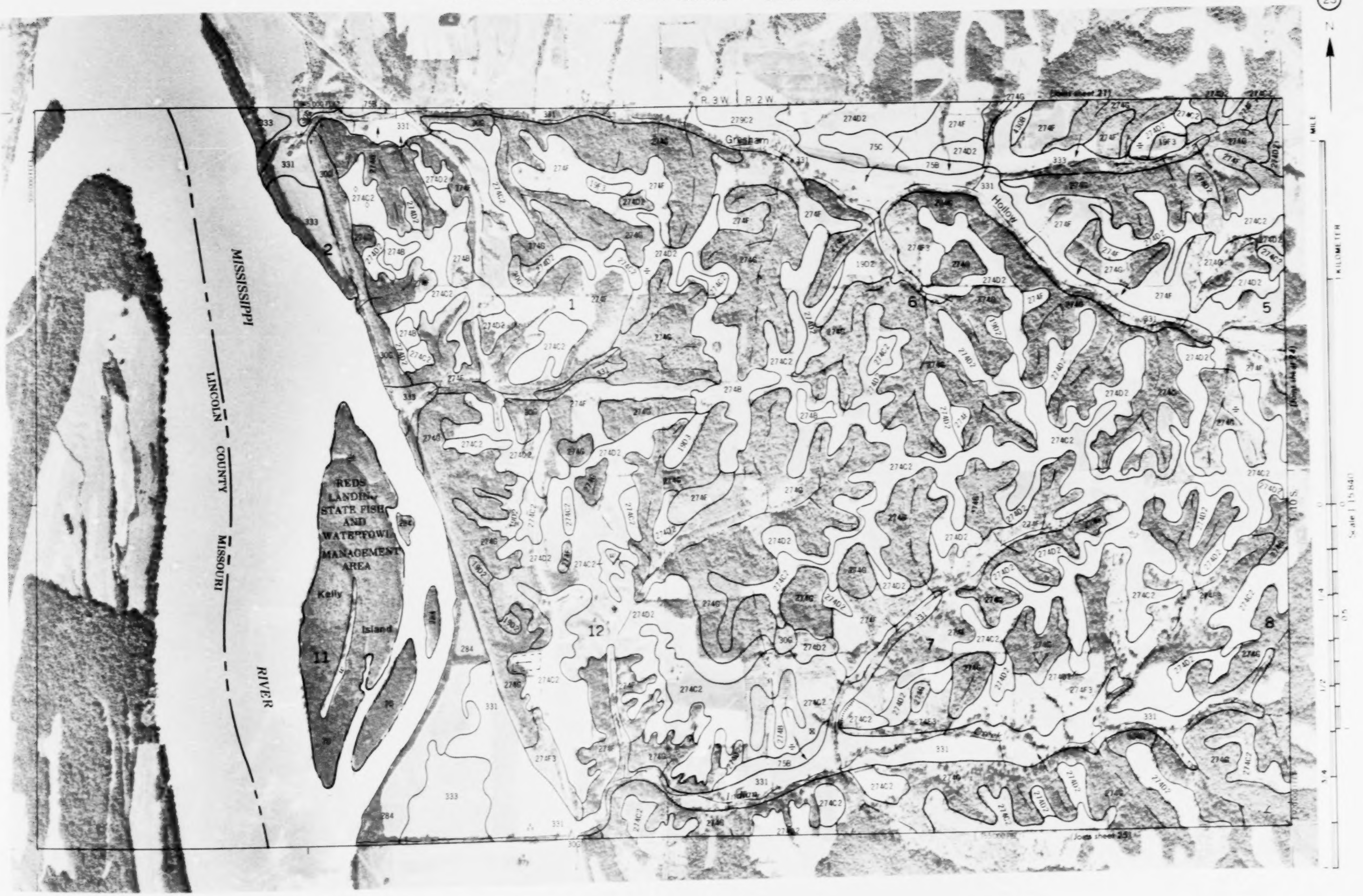

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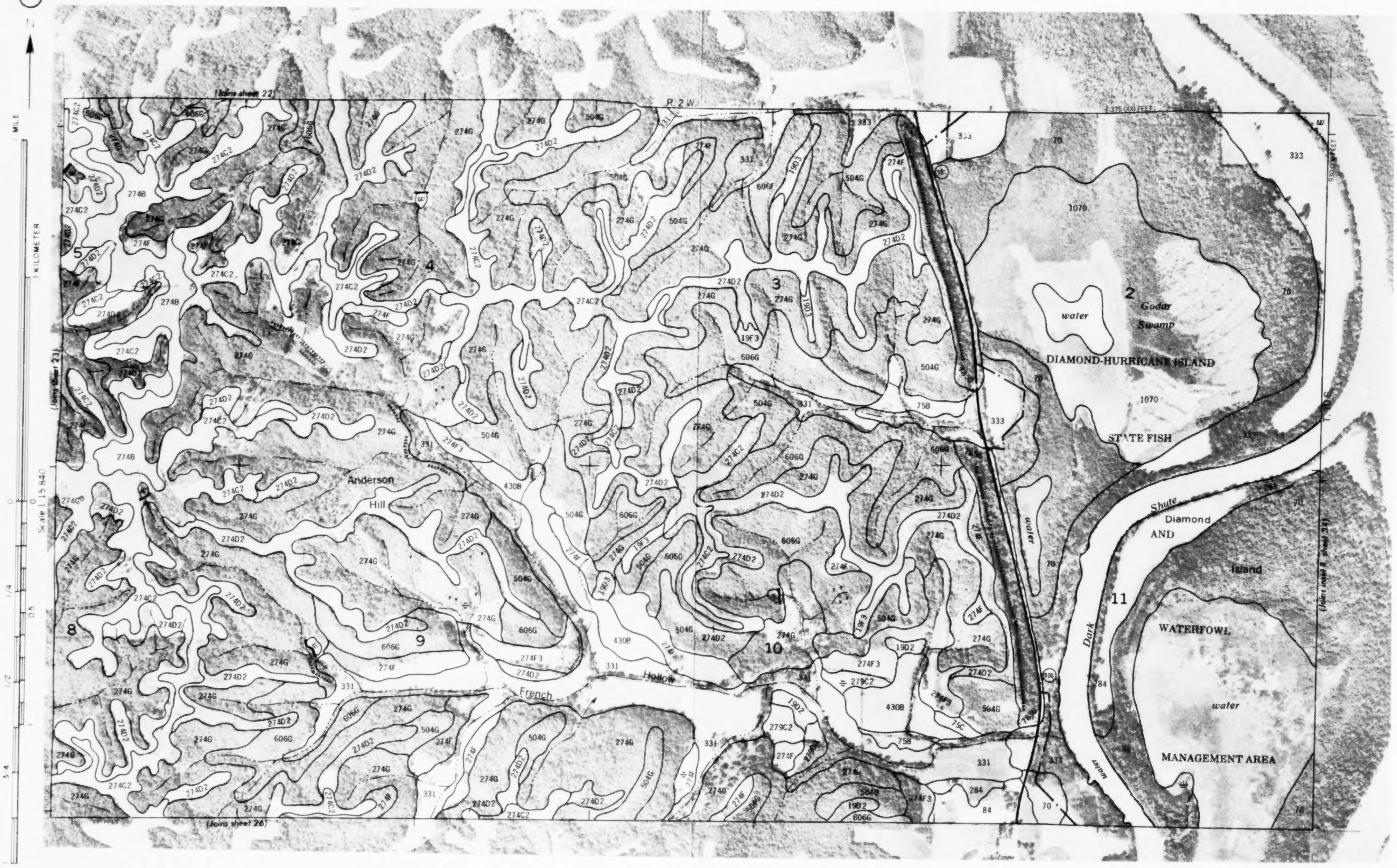

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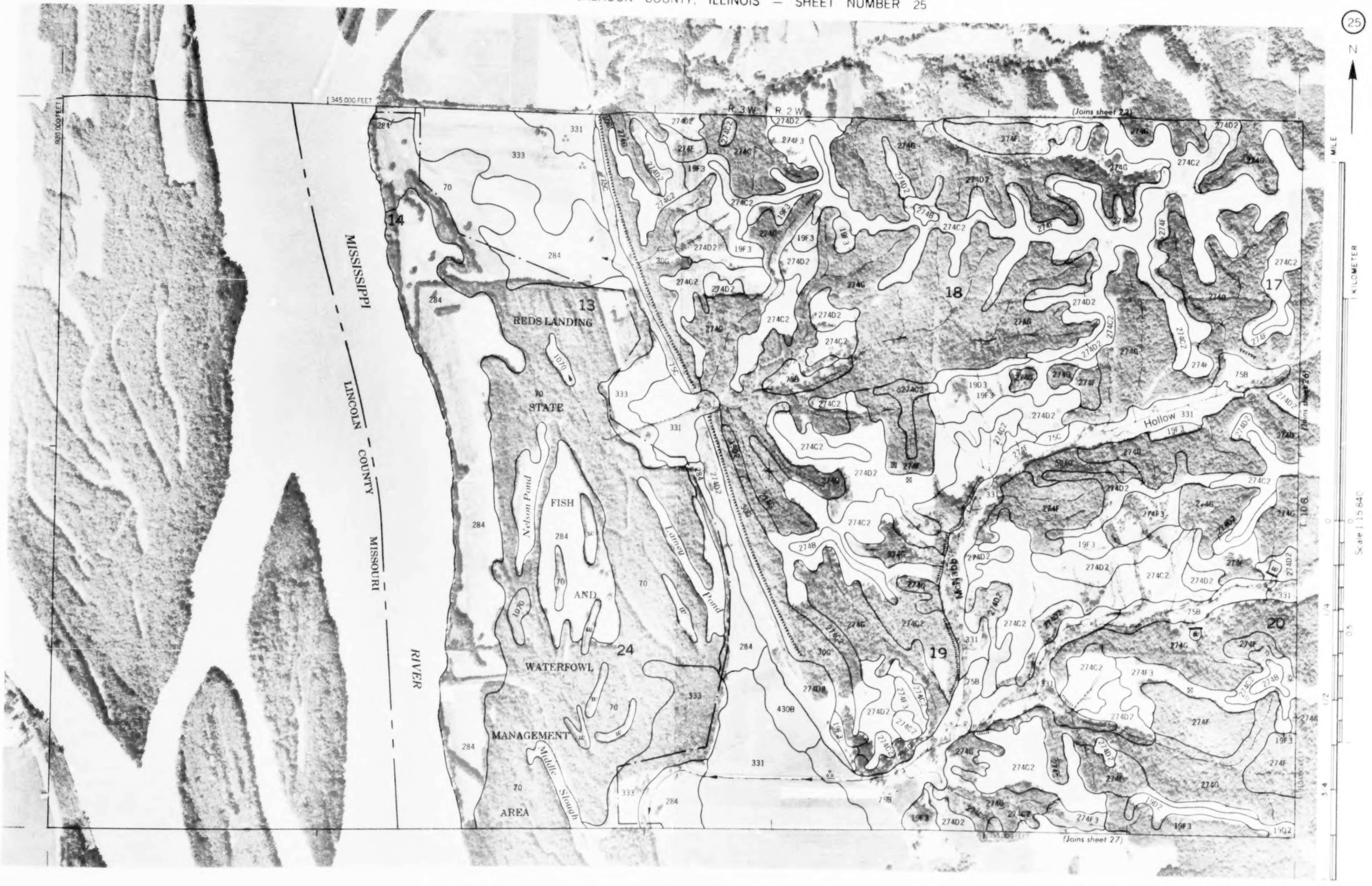

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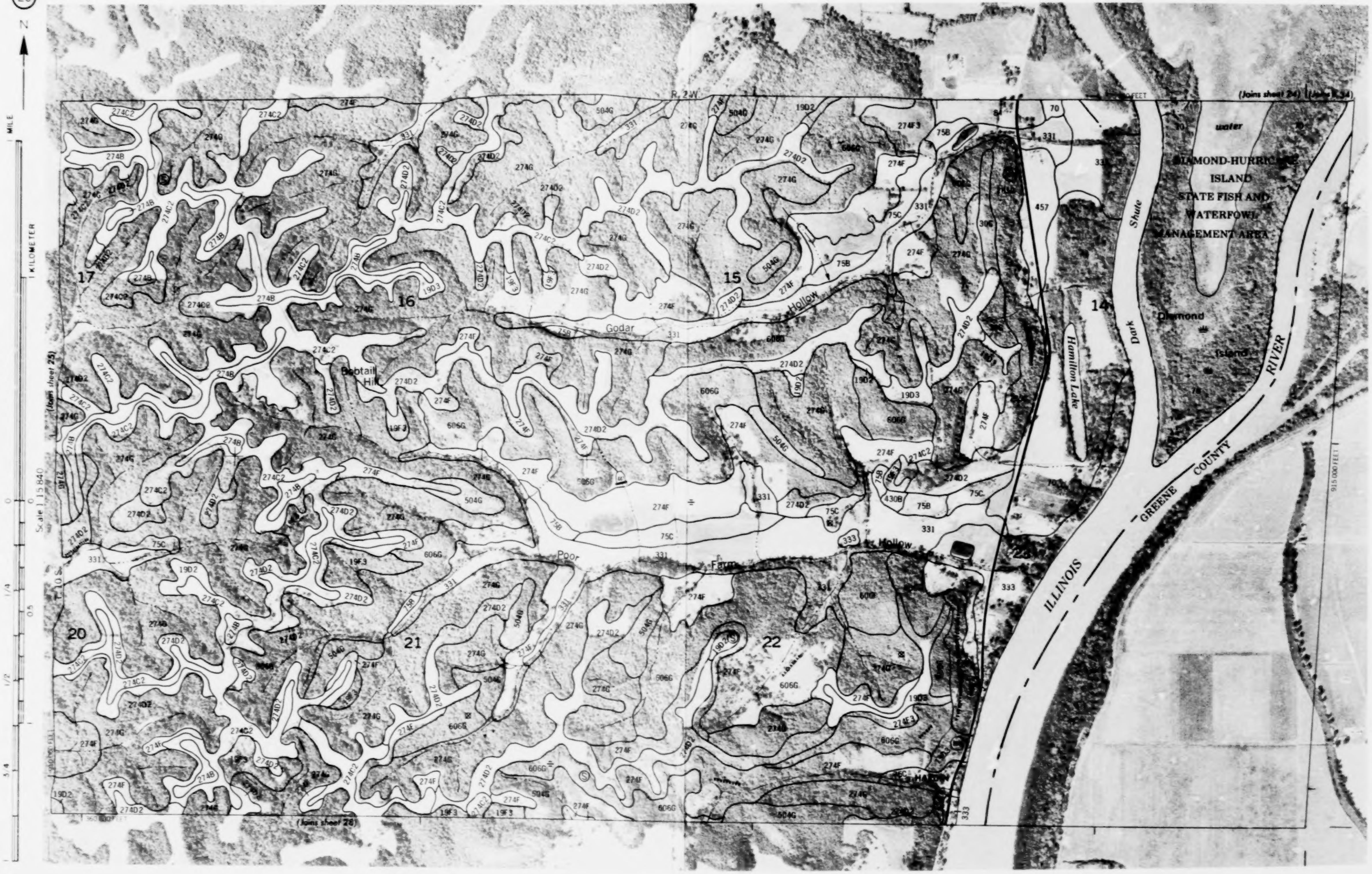

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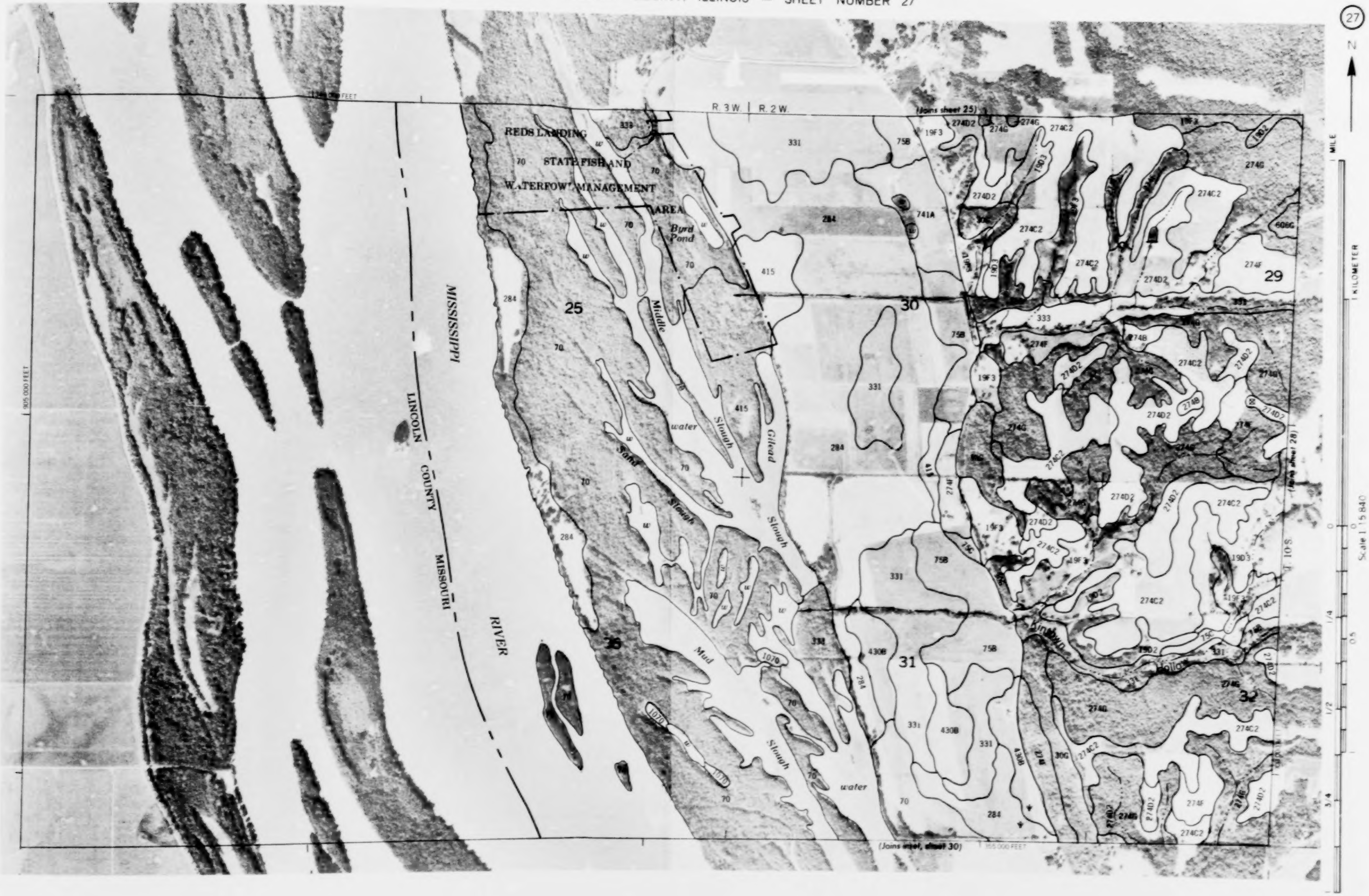

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SOIL MAP OF CALHOUN COUNTY ILLINOIS — SHEET NUMBER 28

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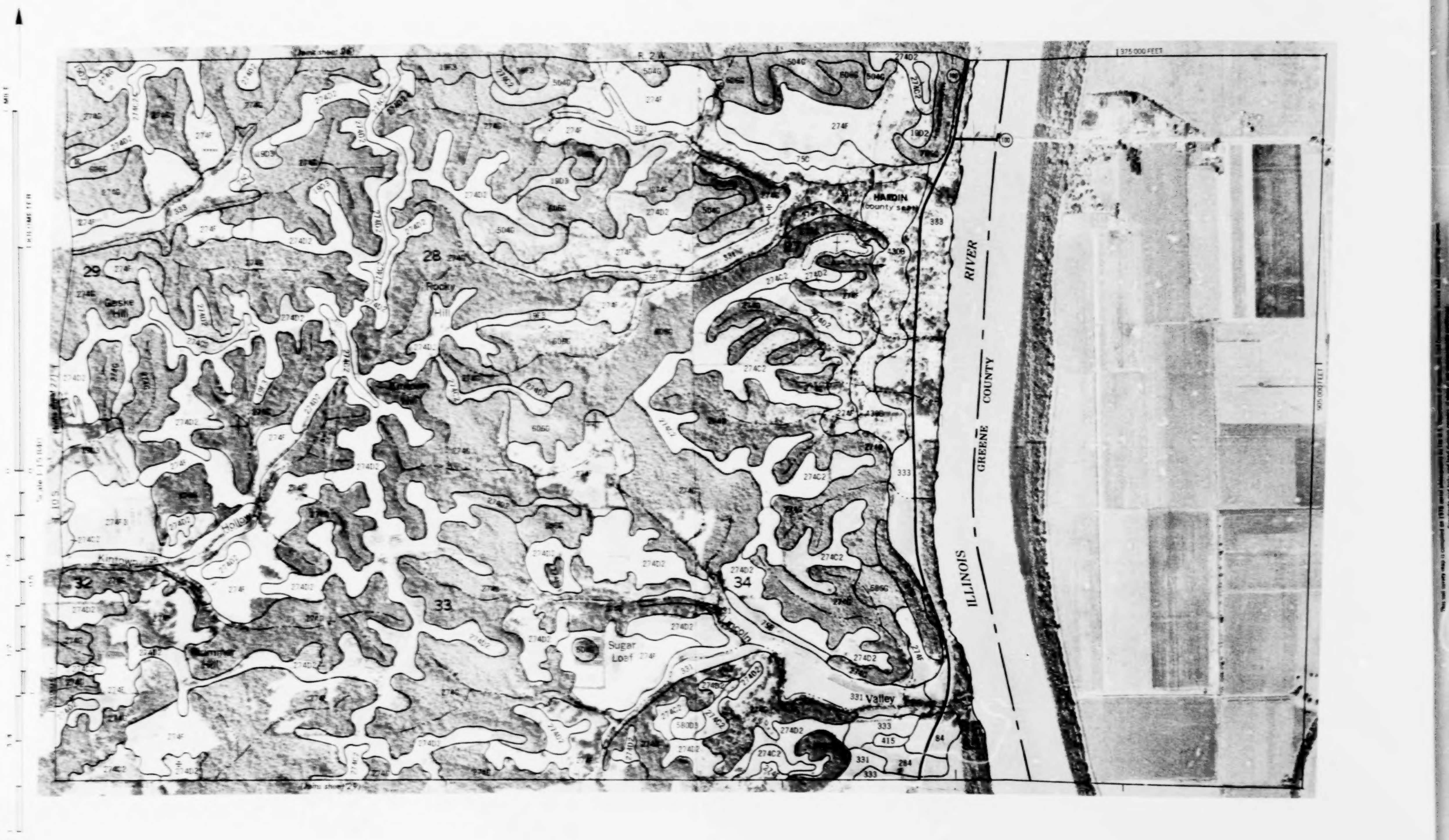

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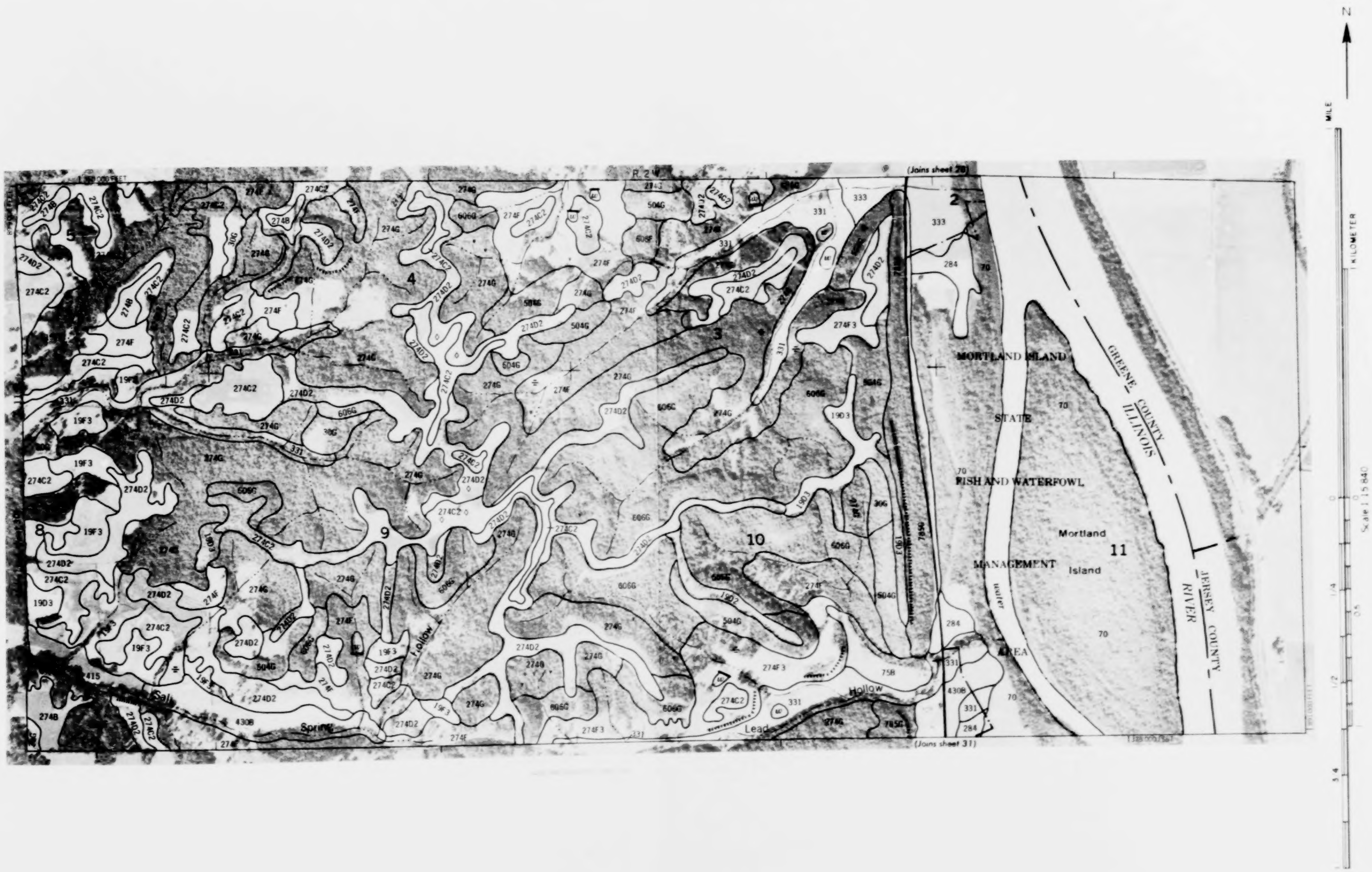

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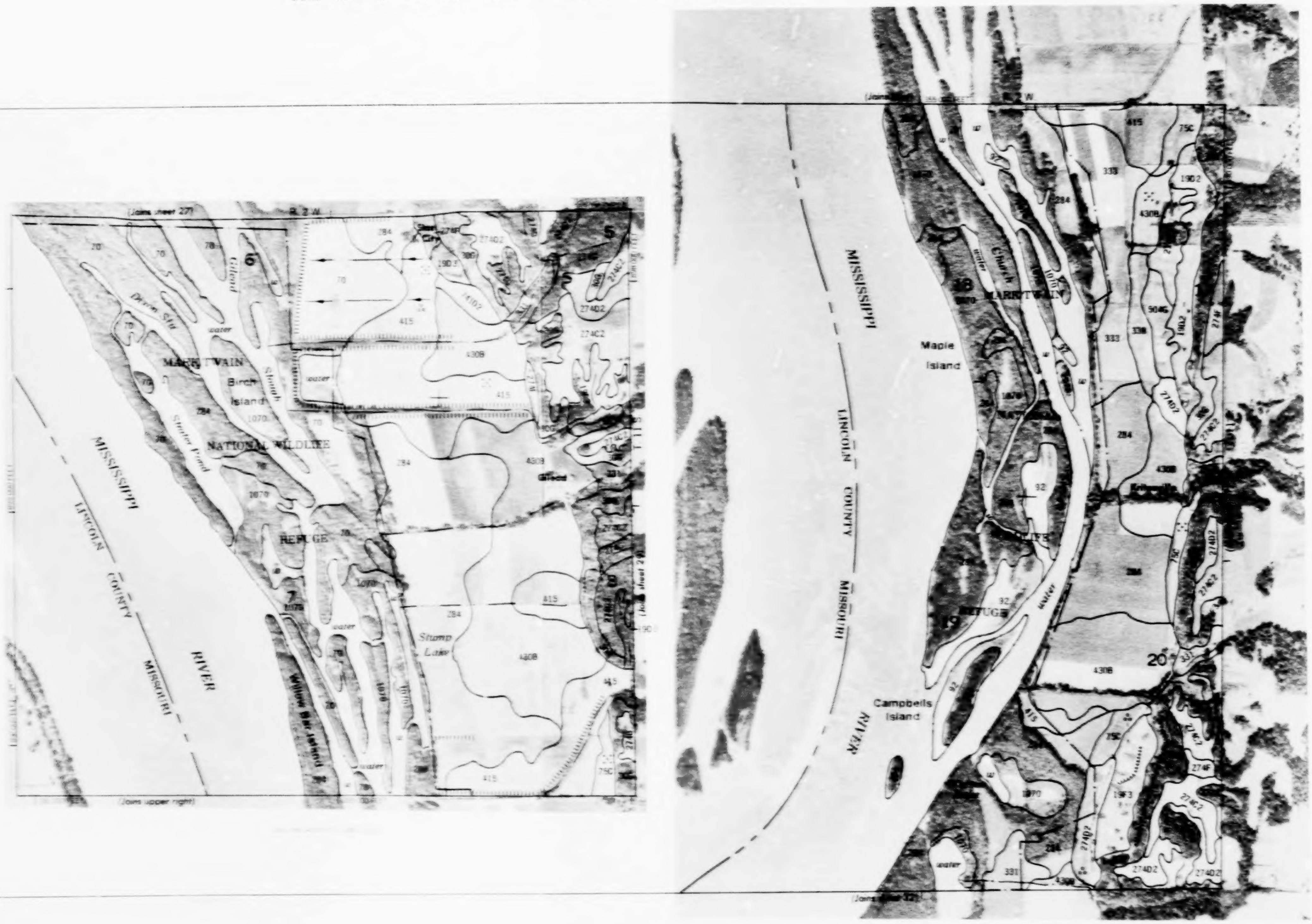

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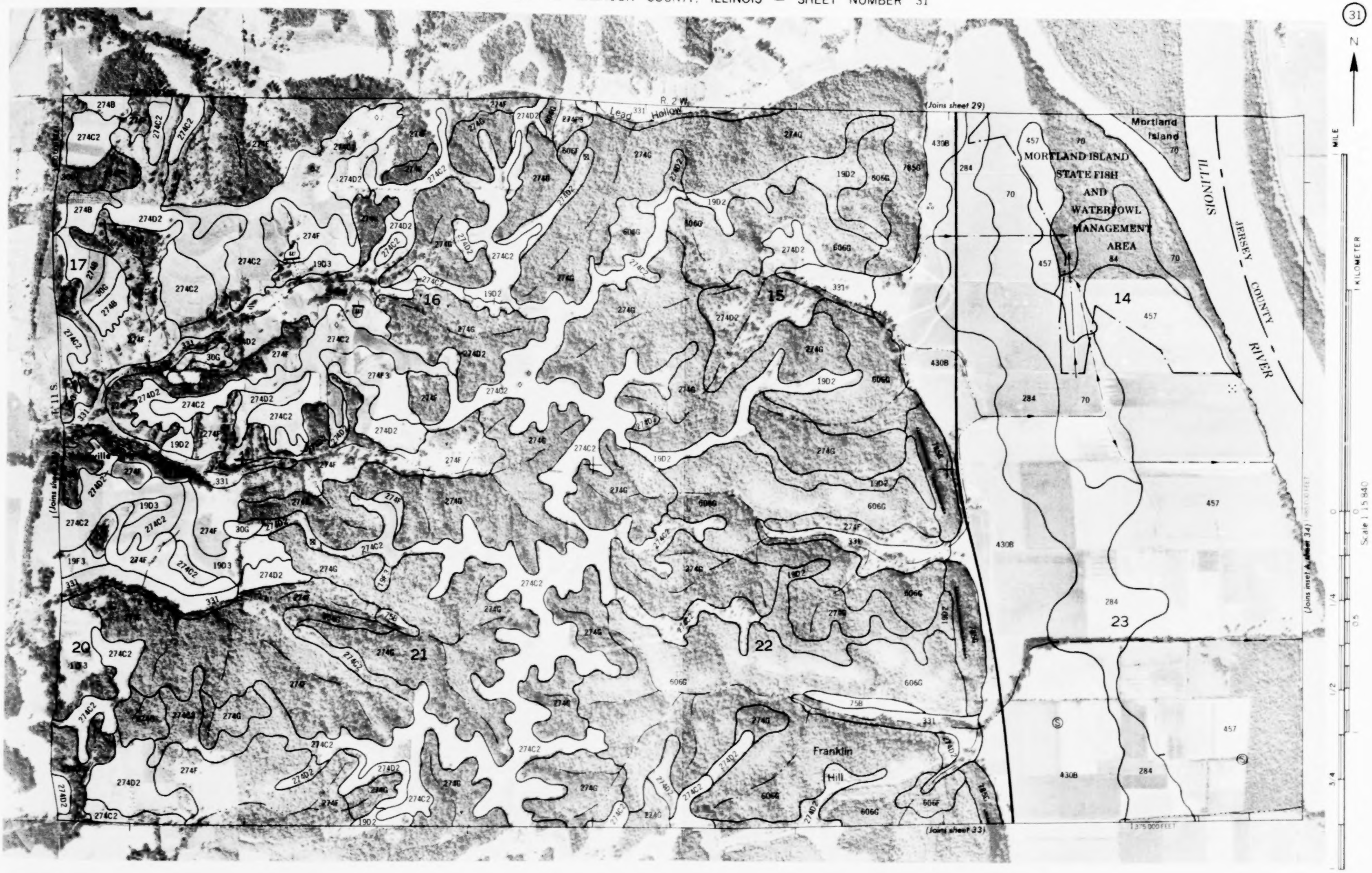

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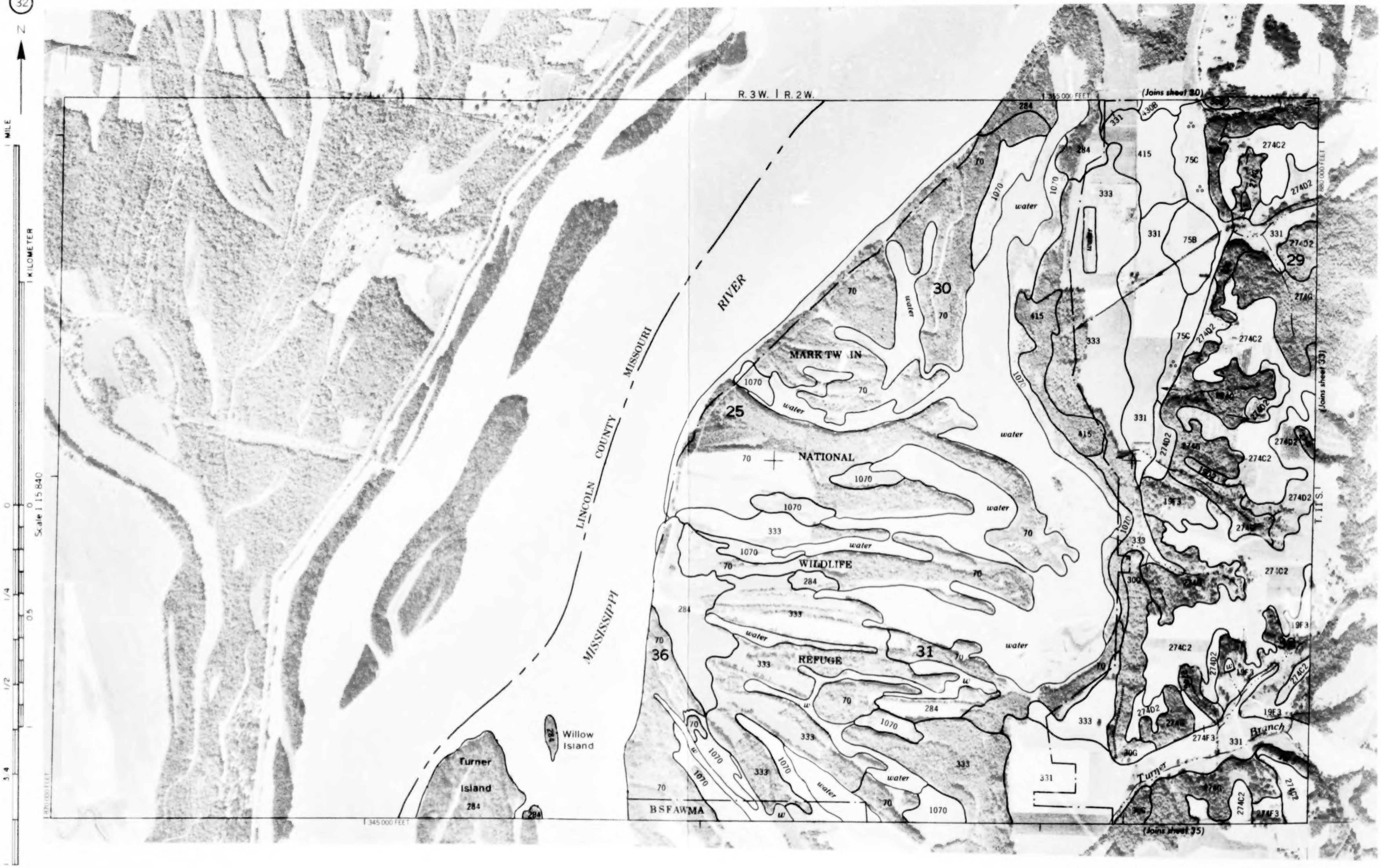

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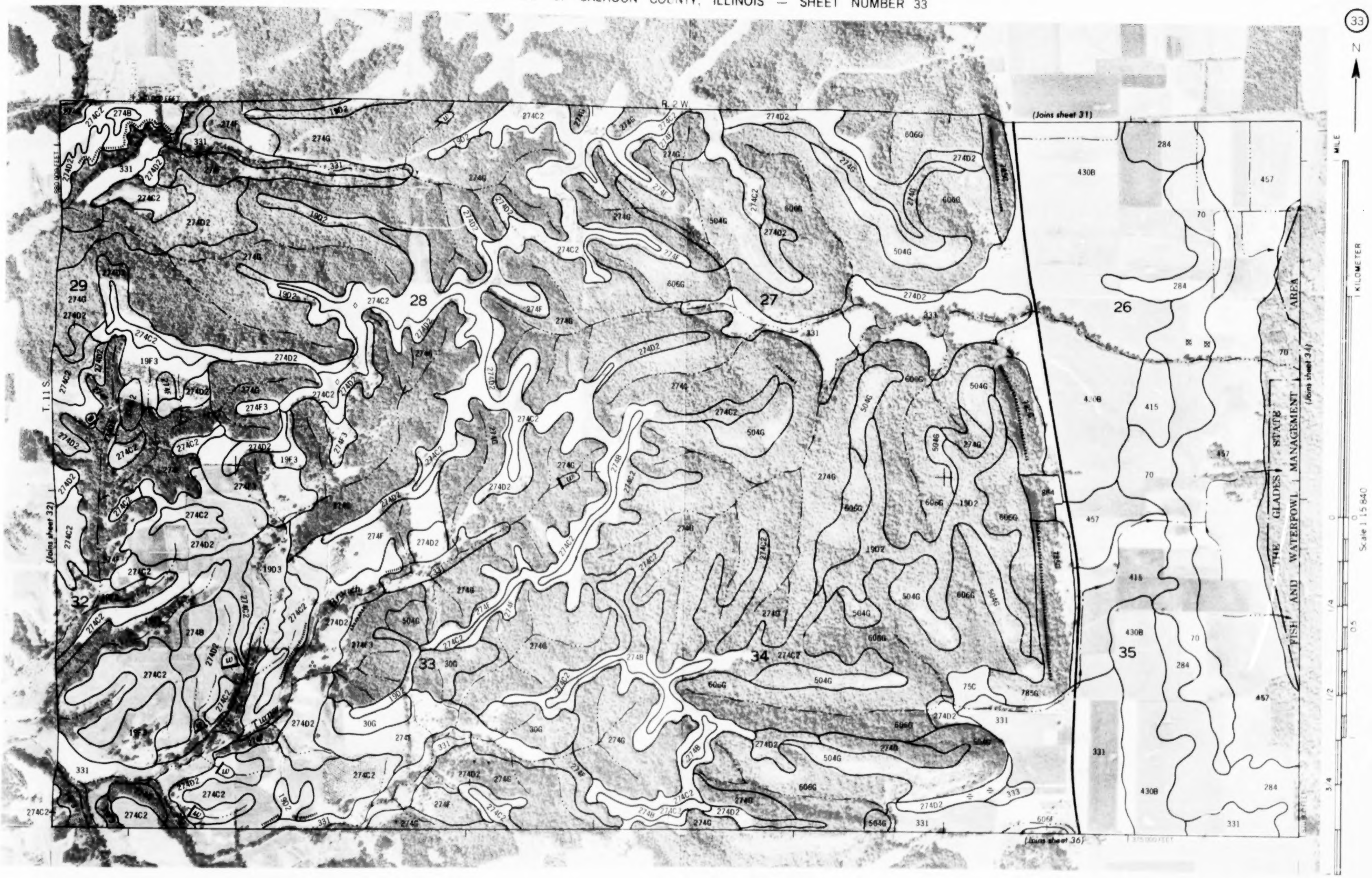

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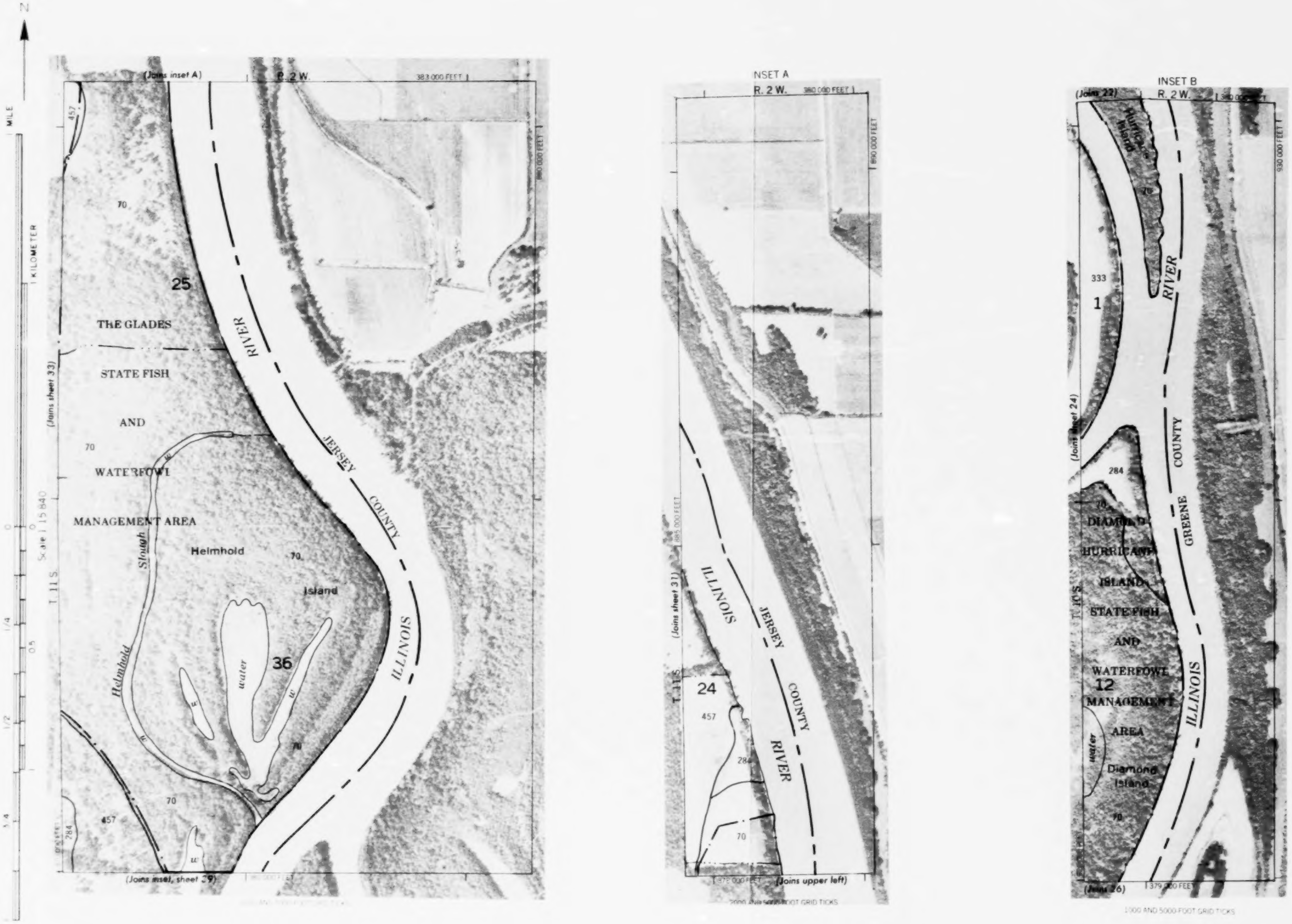

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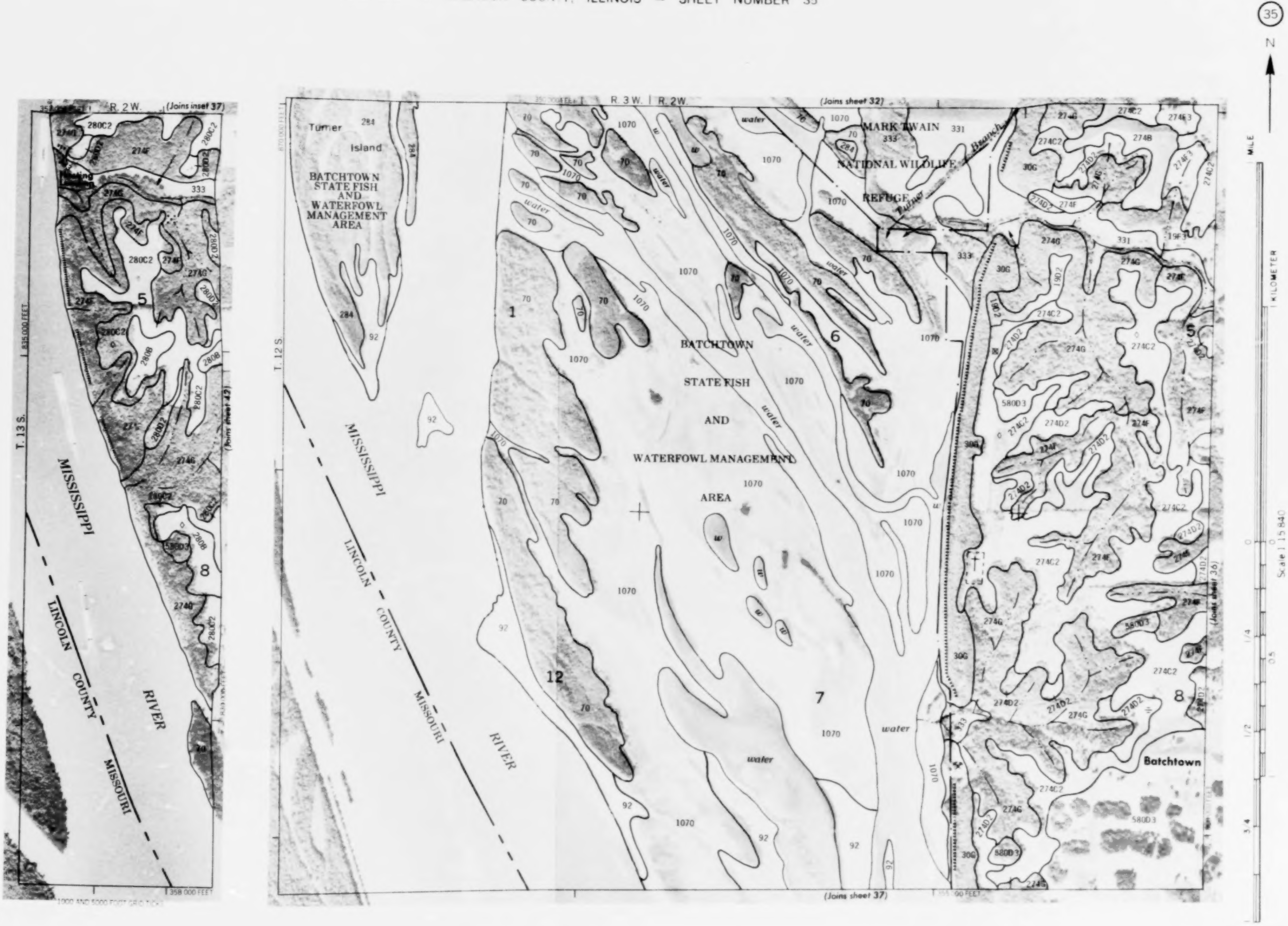

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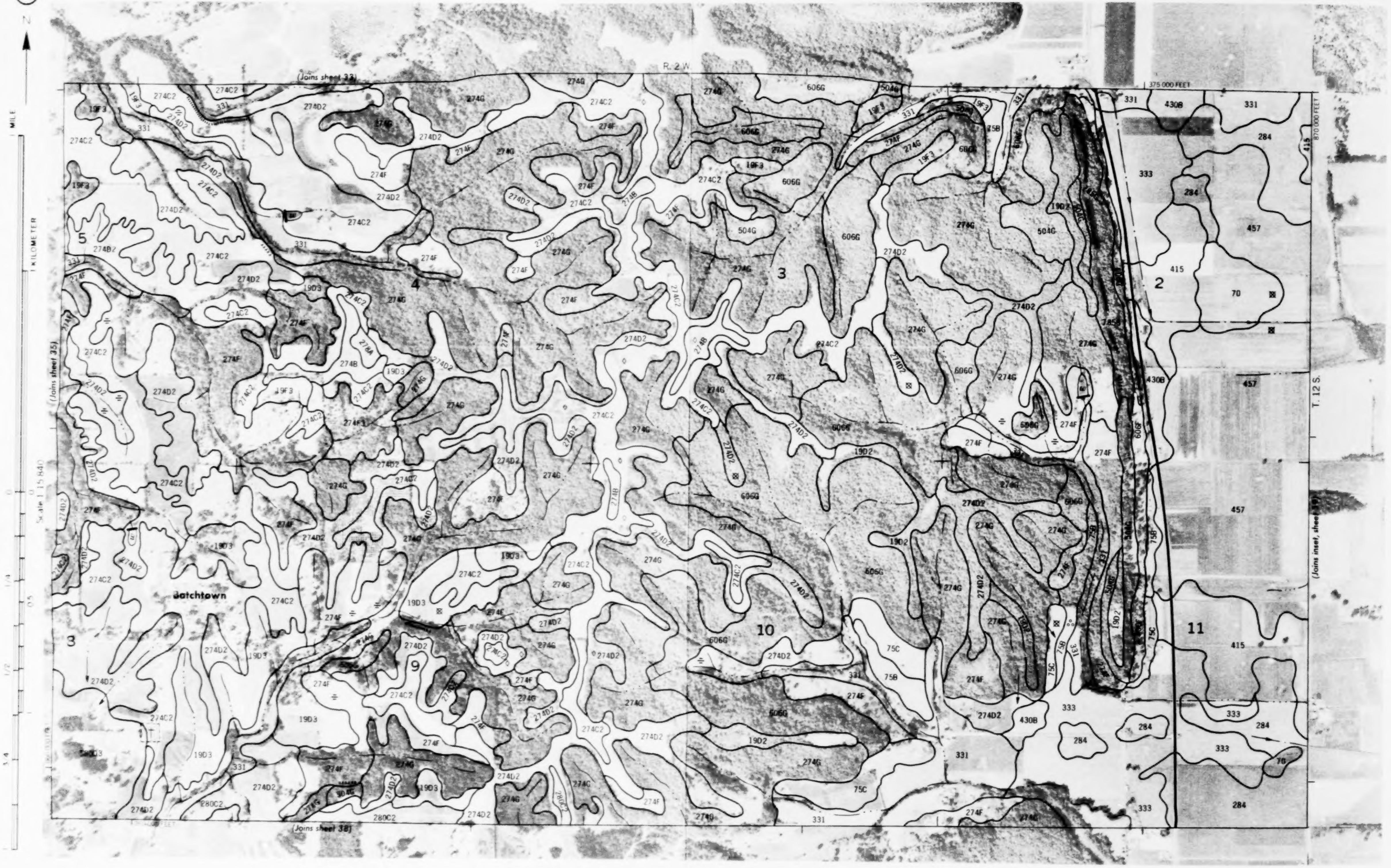

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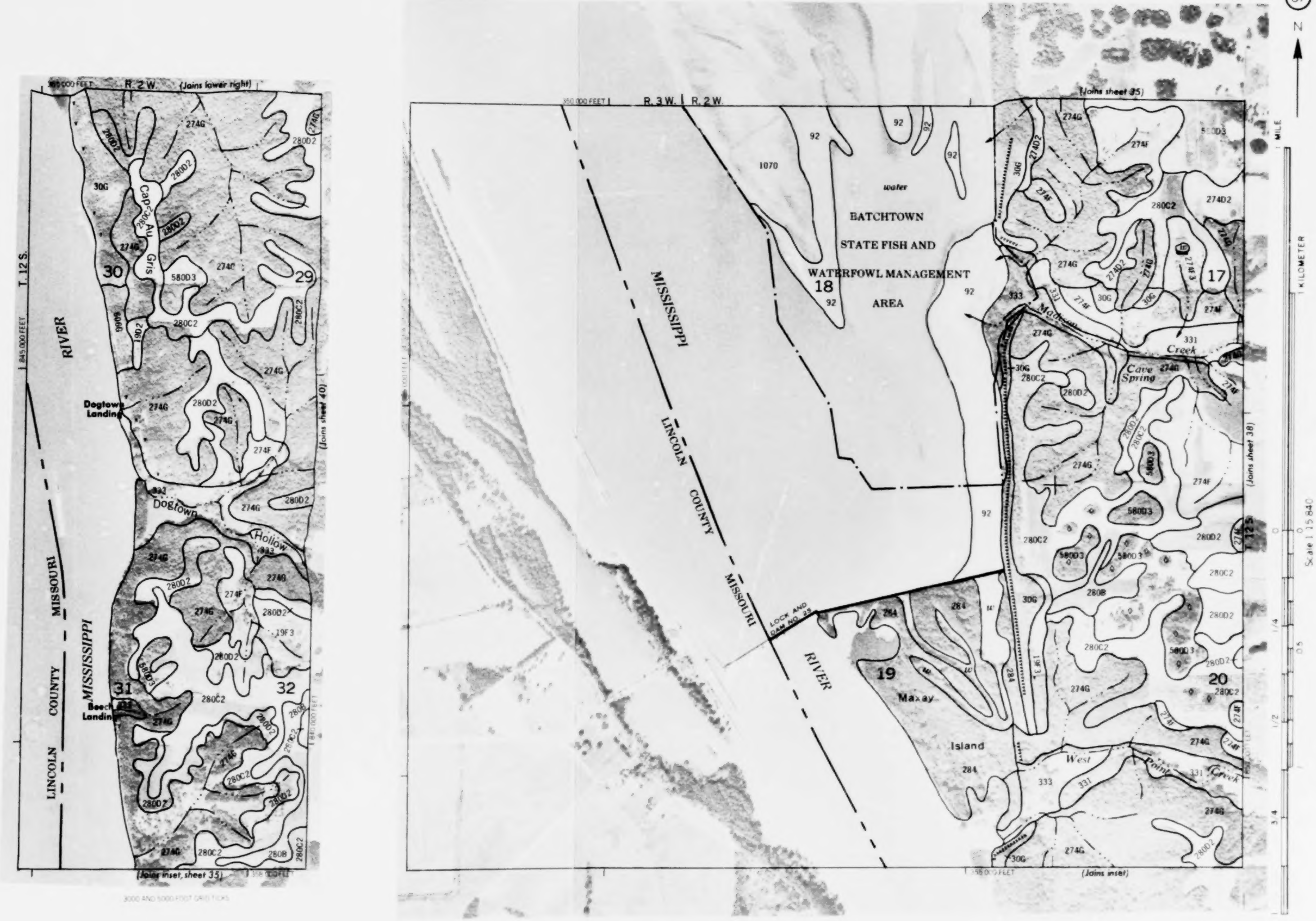

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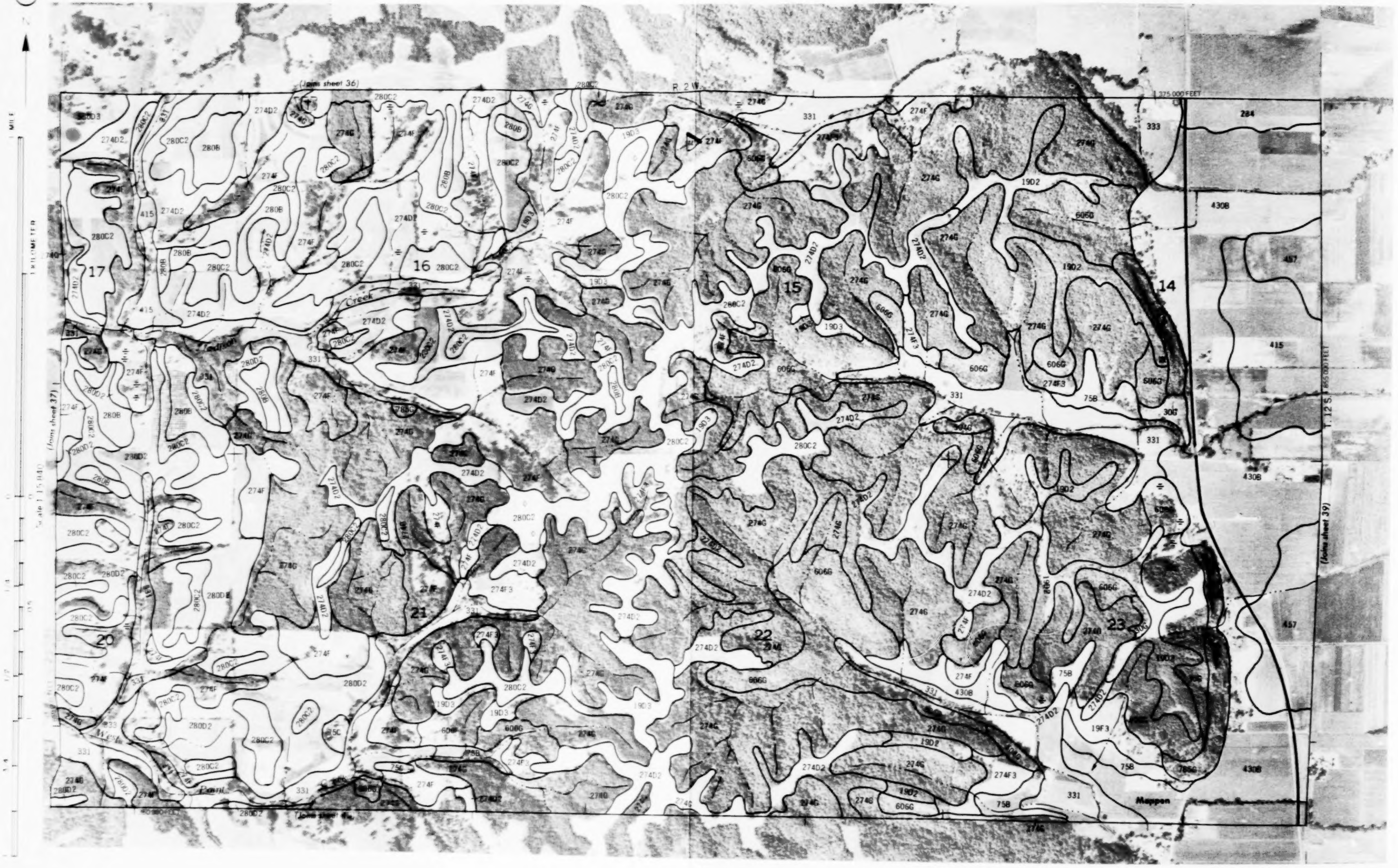

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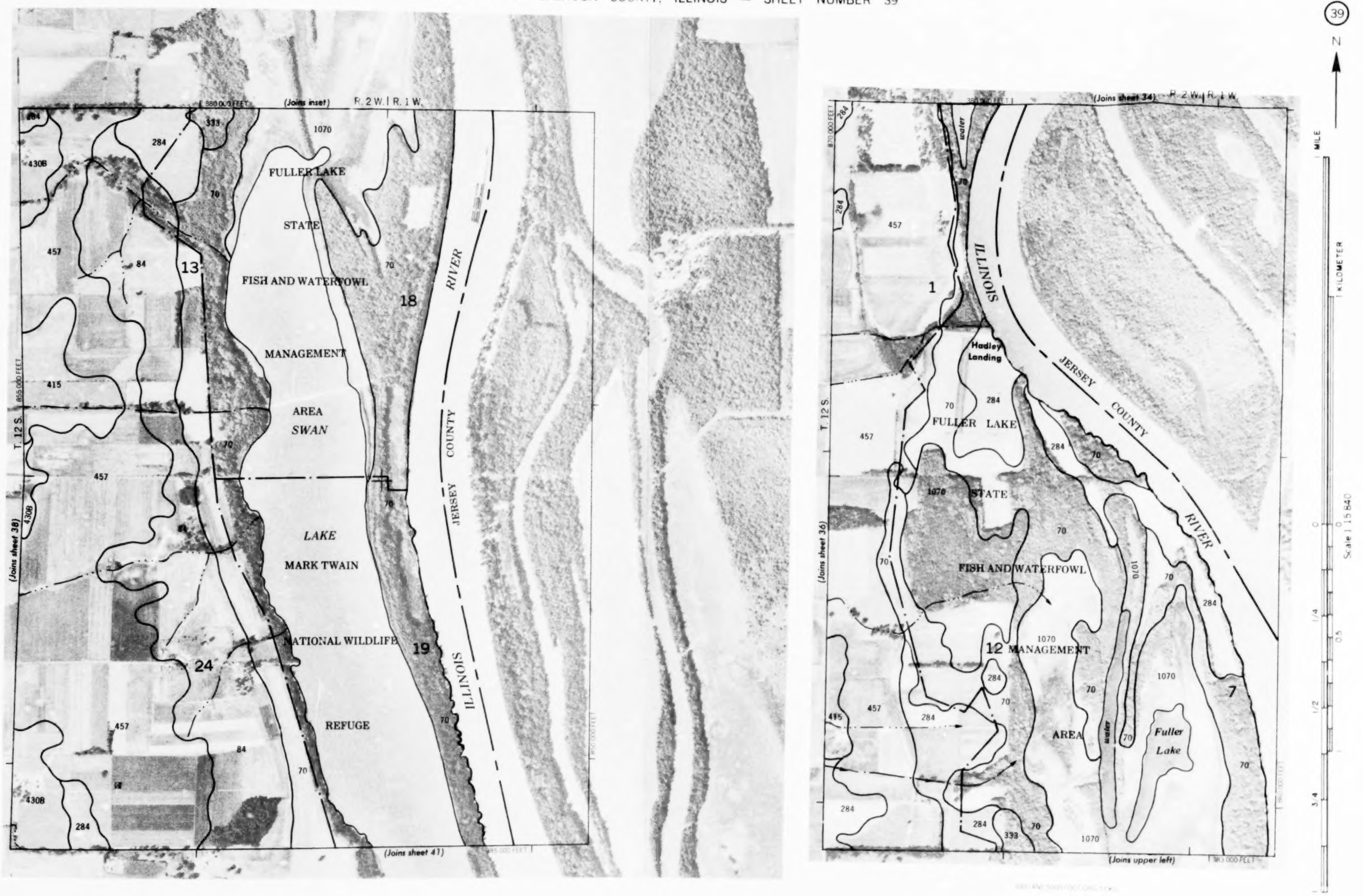

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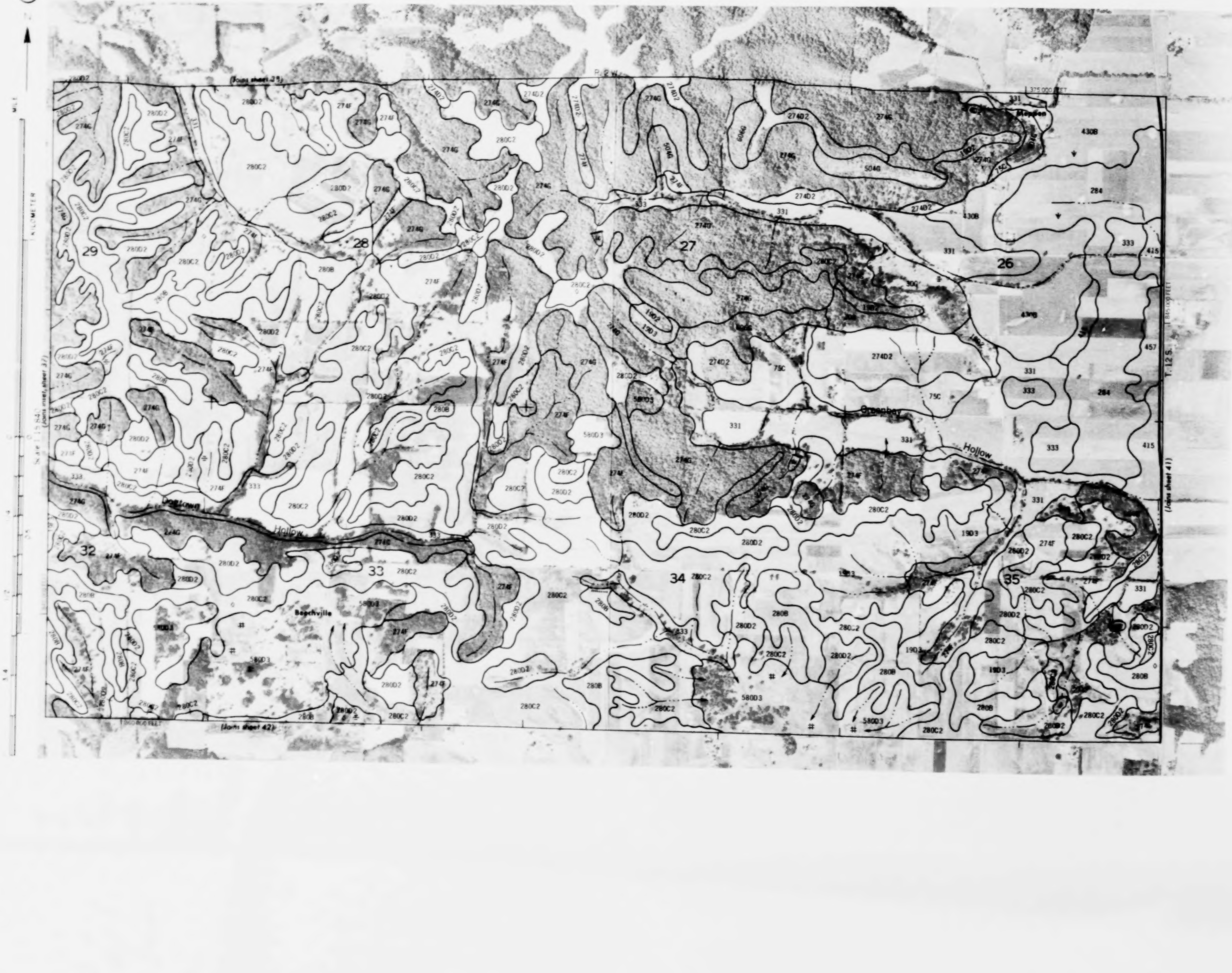

SOIL MAP OF CALHOUN COUNTY, ILLINOIS — SHEET NUMBER 41

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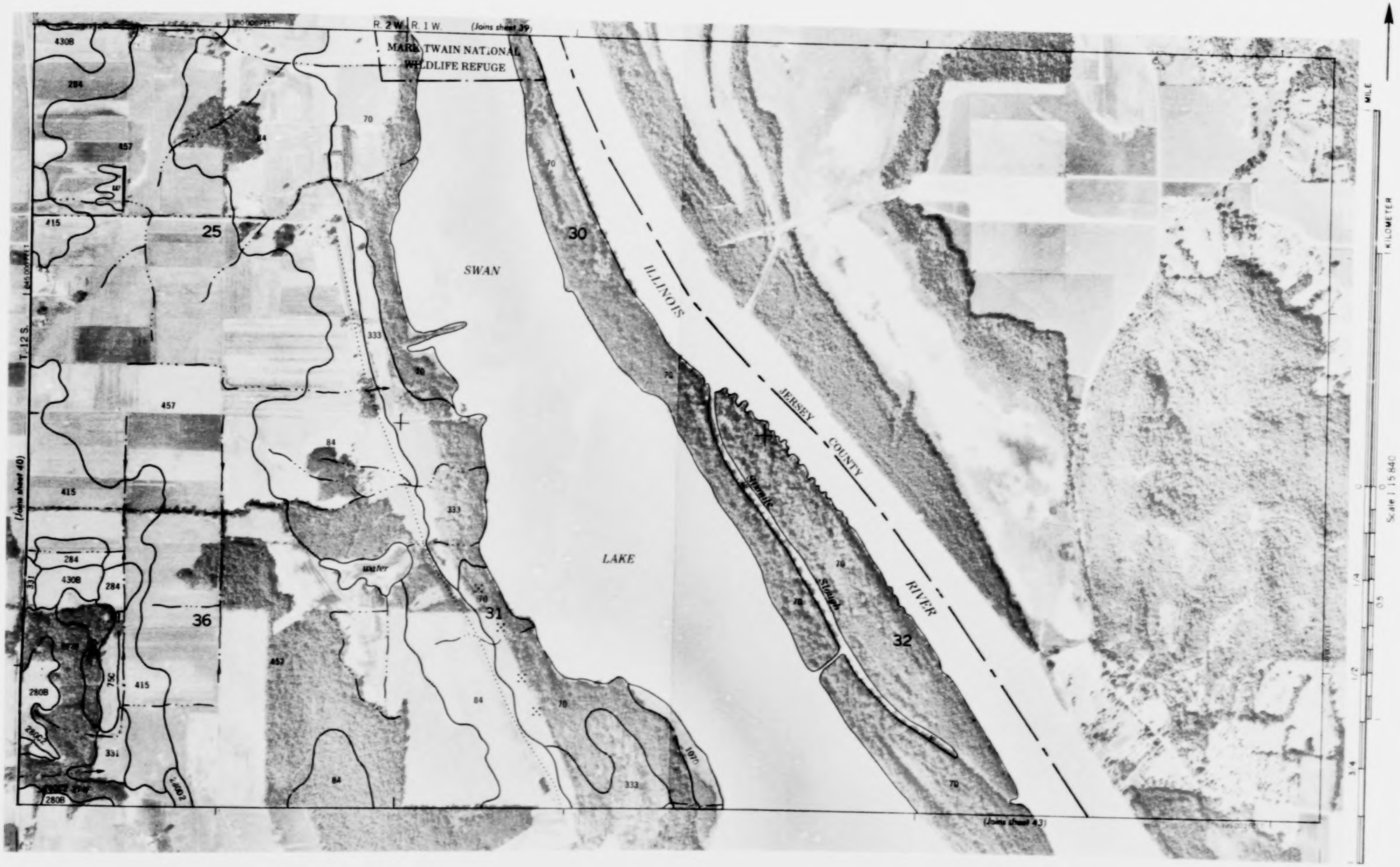

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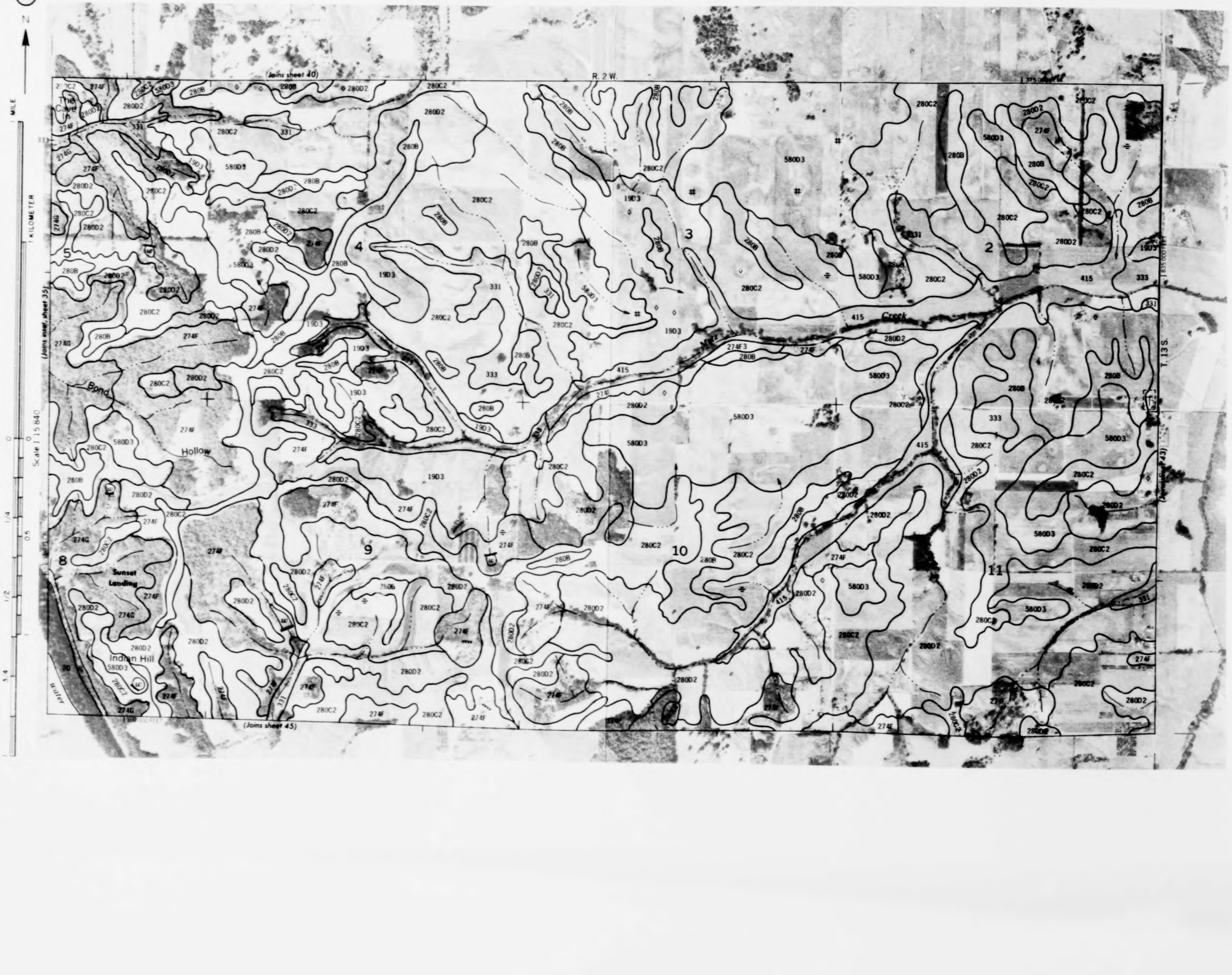

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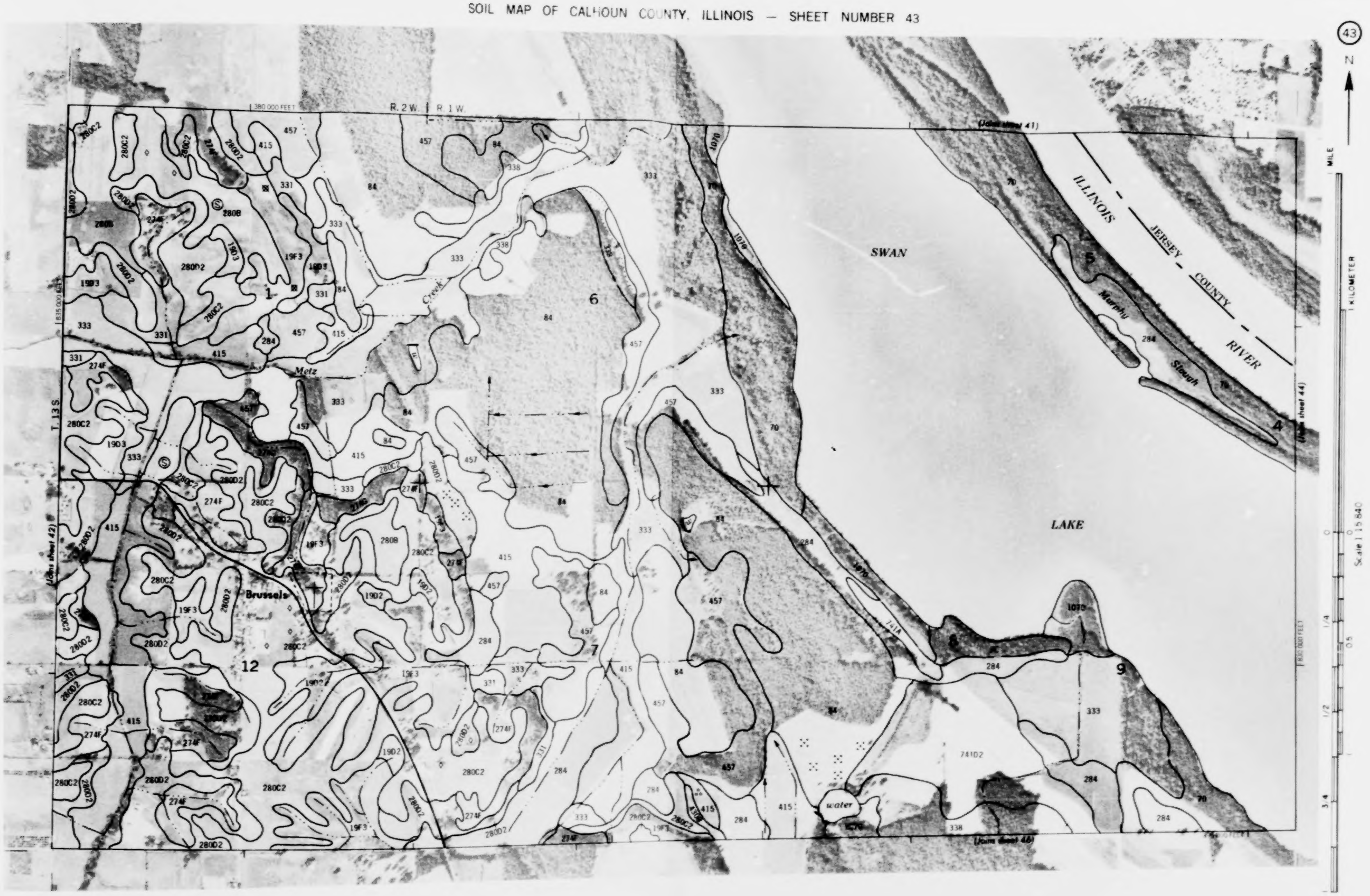

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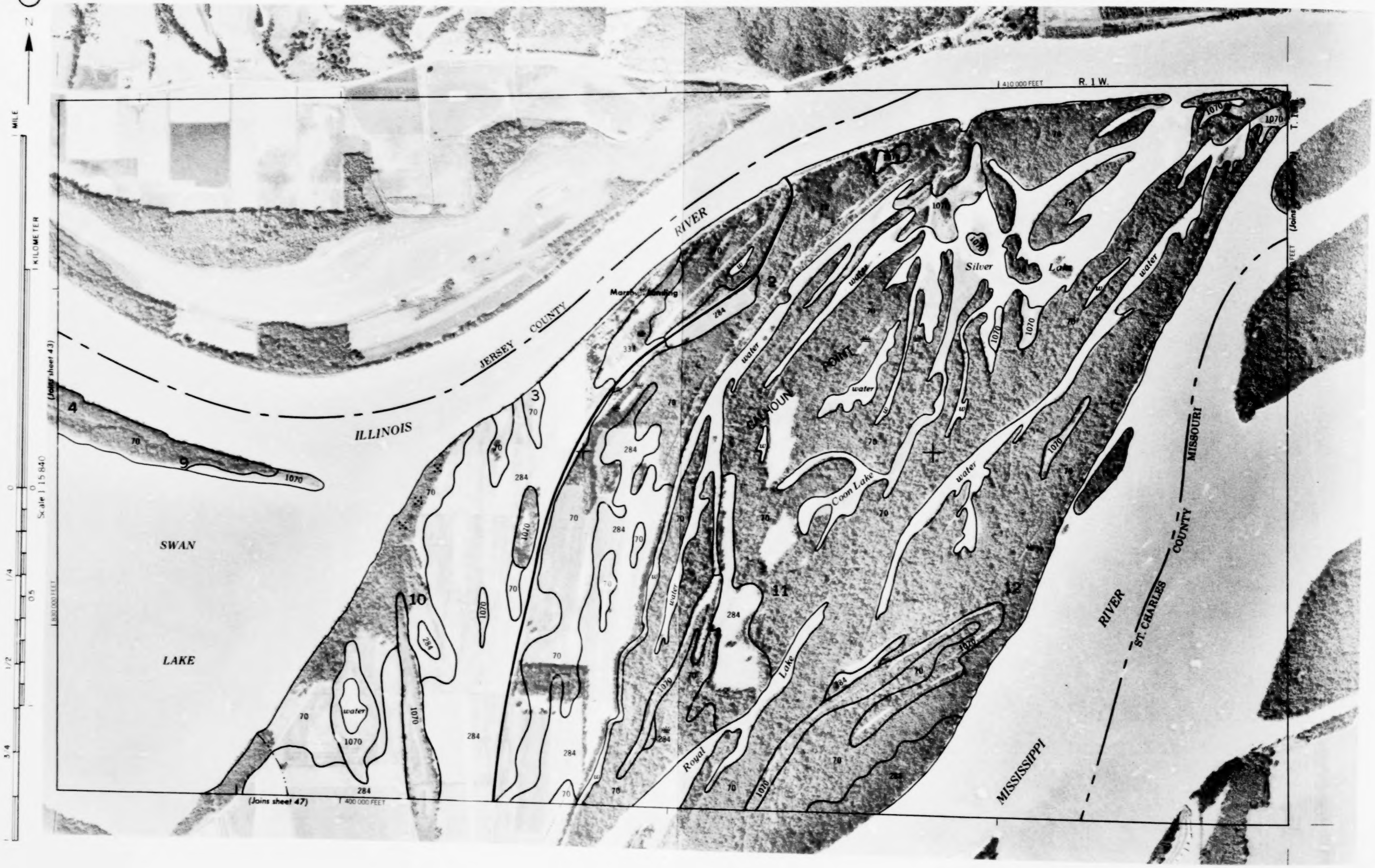

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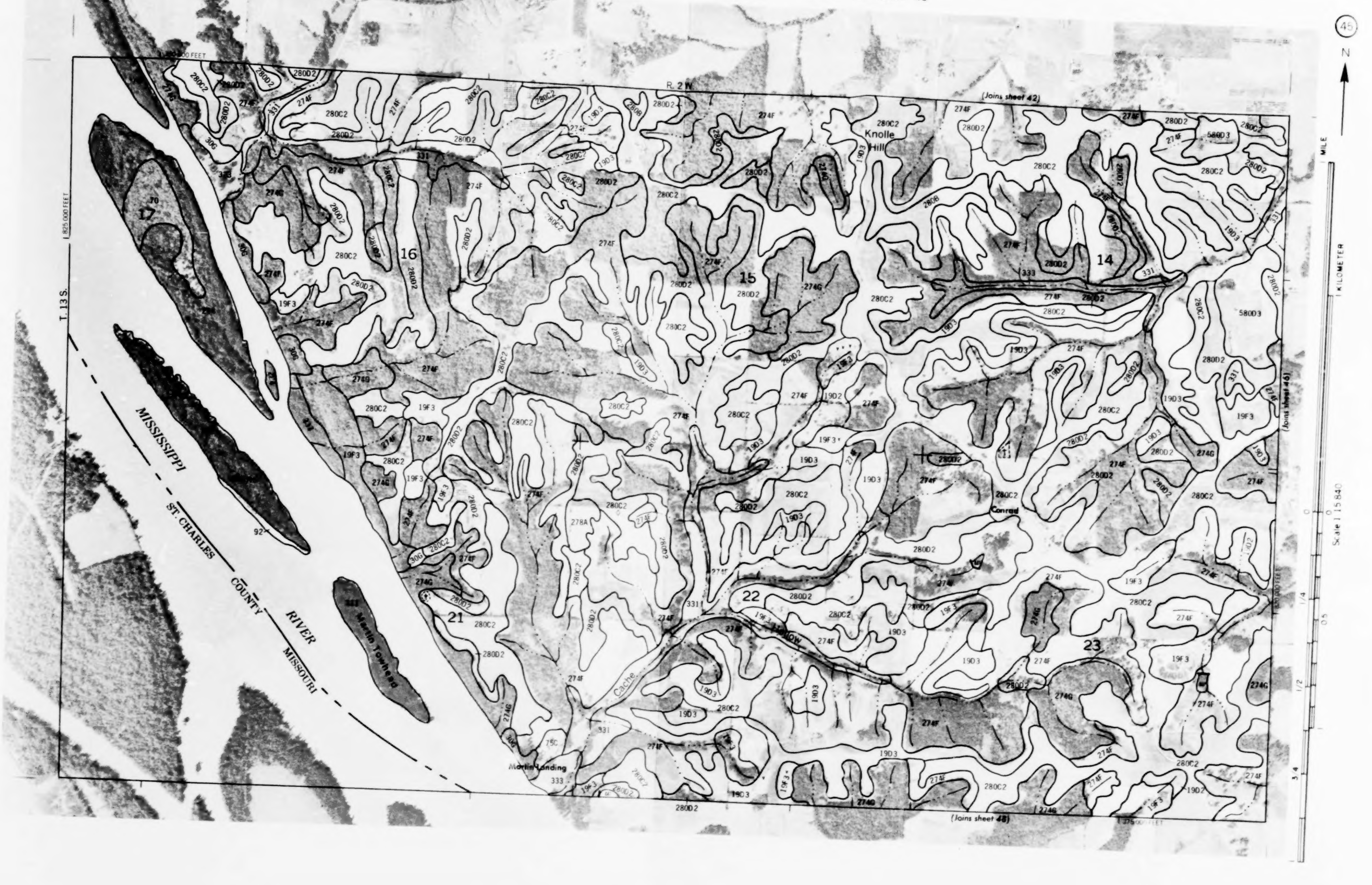

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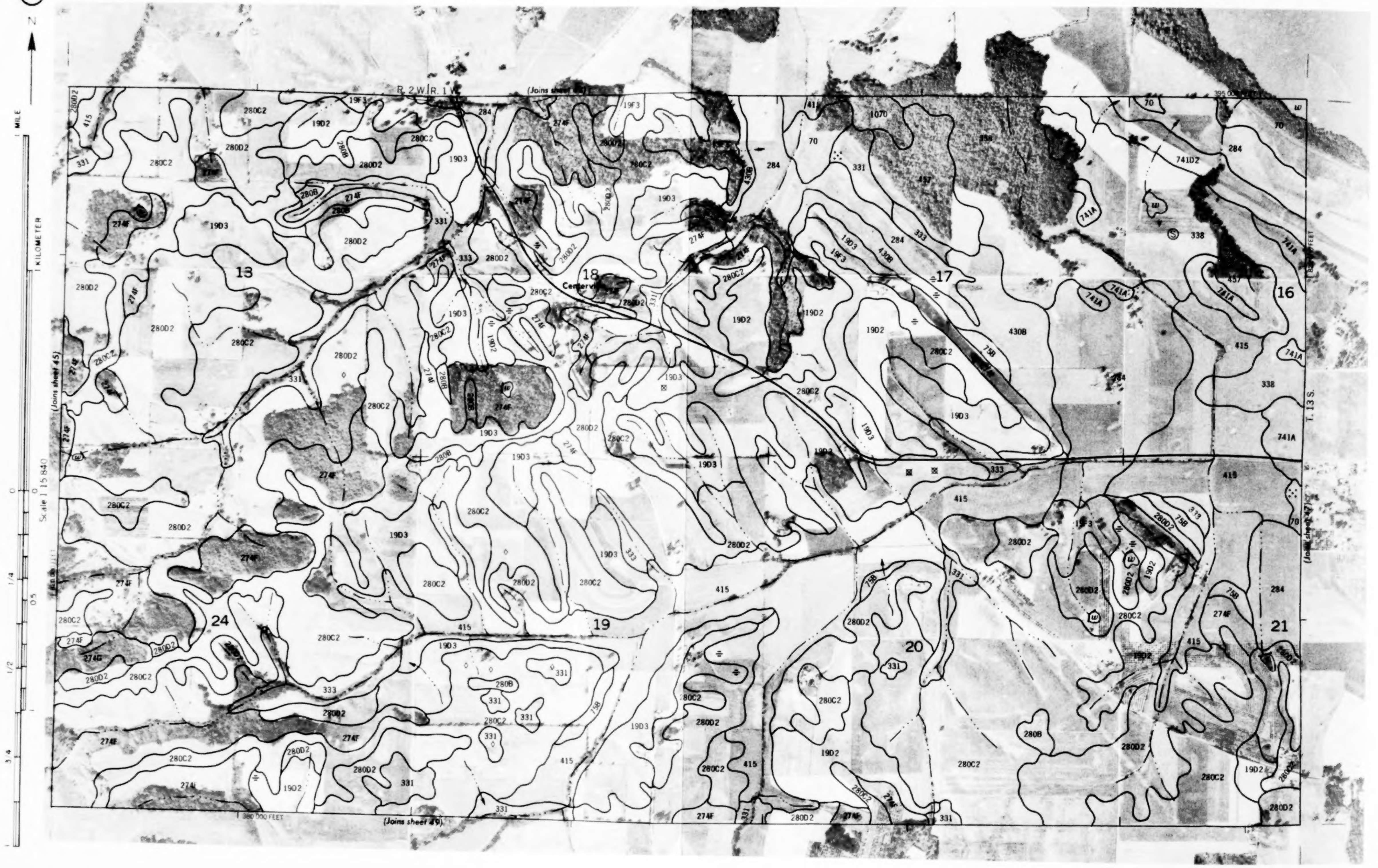

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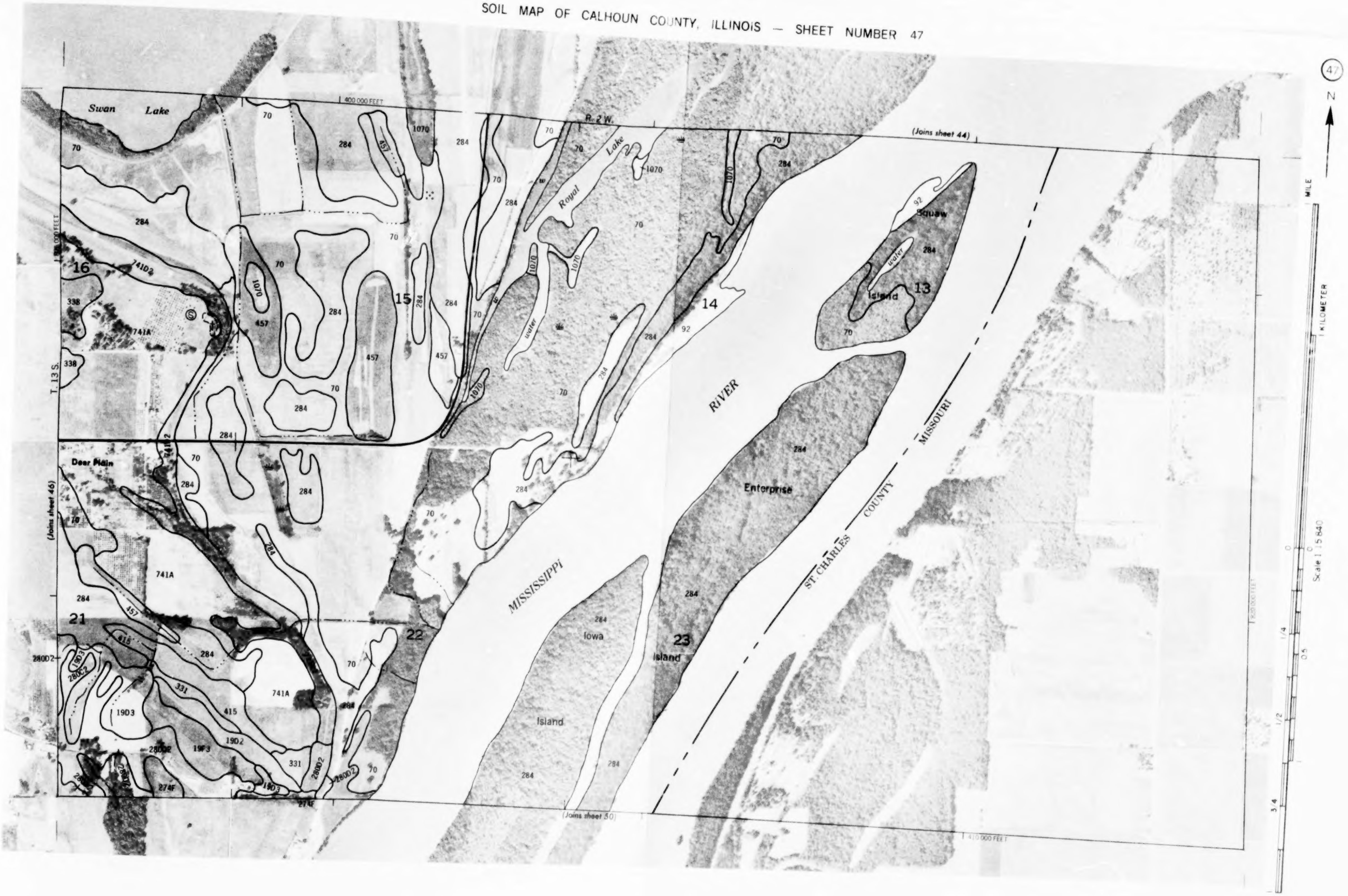

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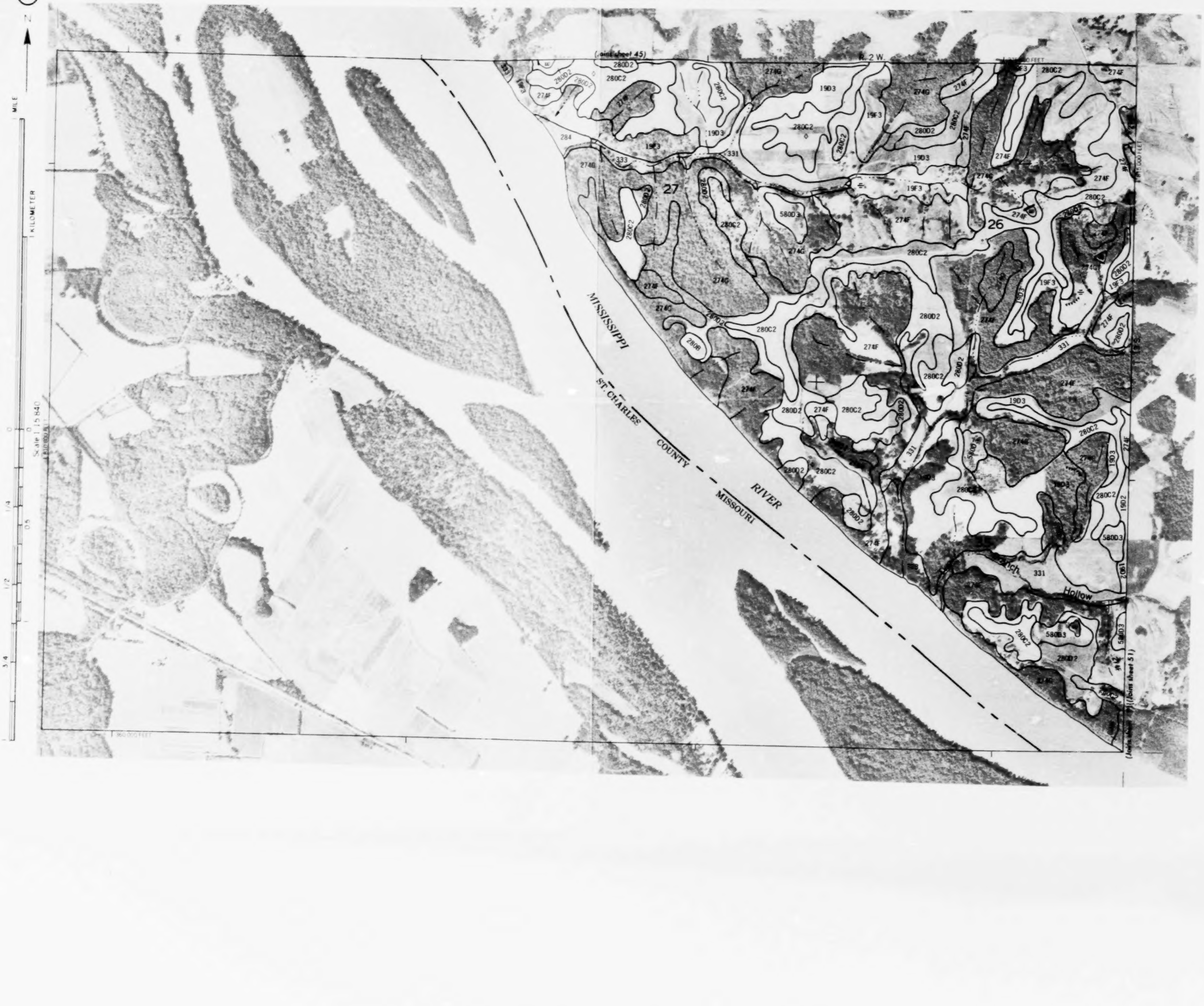
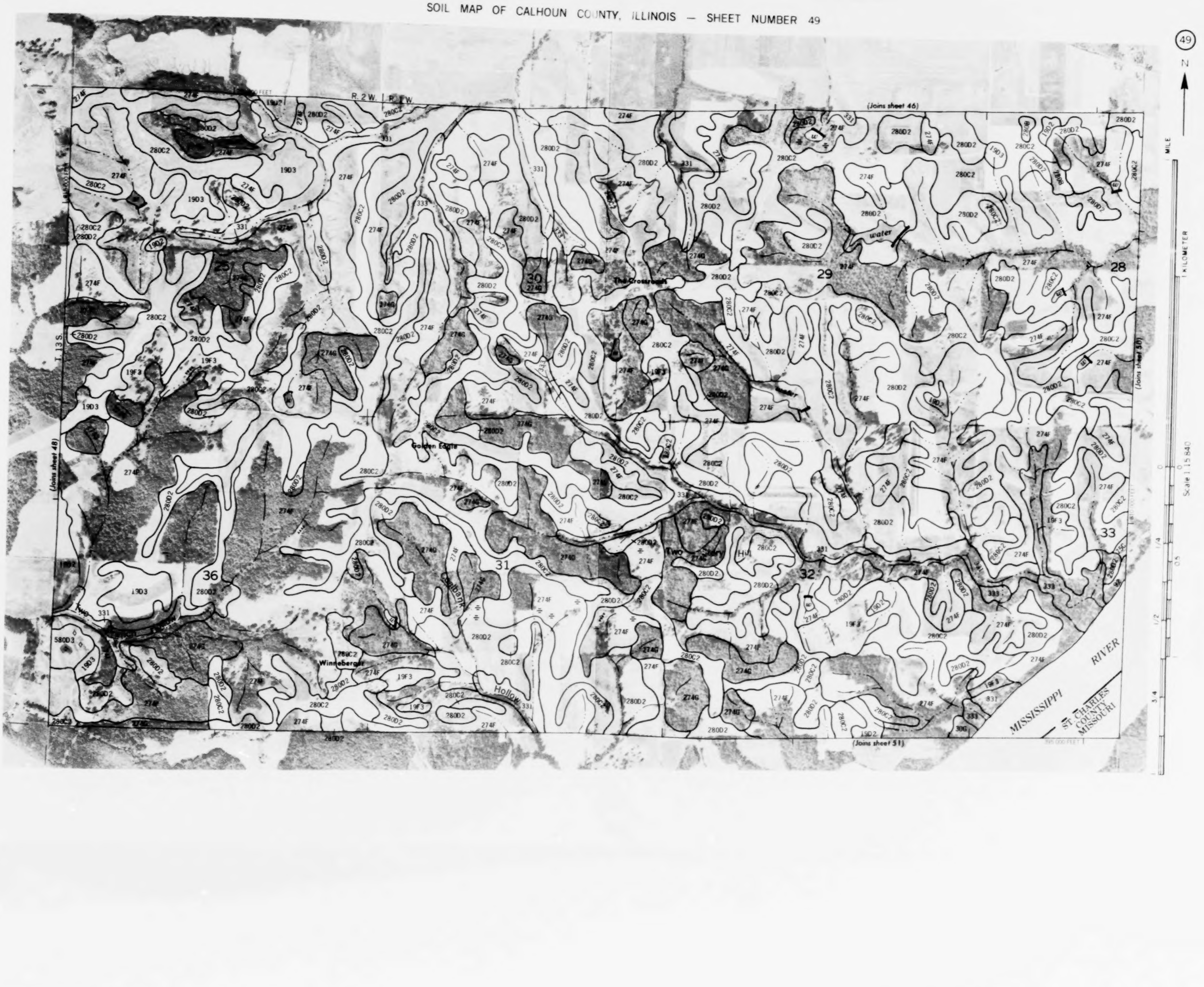
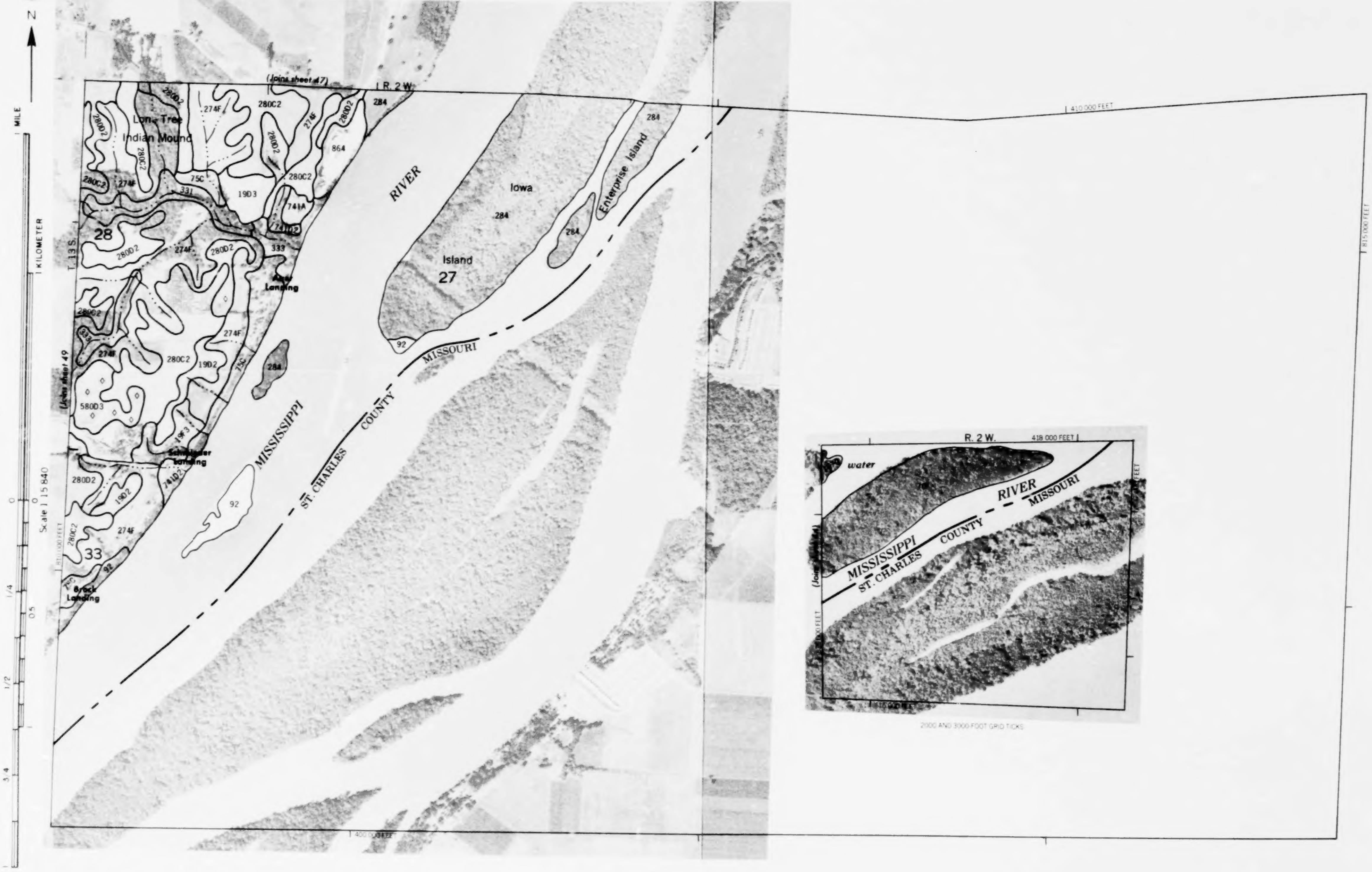


SOIL MAP OF CALHOUN COUNTY, ILLINOIS — SHEET NUMBER 49



SOIL MAP OF CALHOUN COUNTY, ILLINOIS — SHEET NUMBER 50



SOIL MAP OF CALHOUN COUNTY, ILLINOIS — SHEET NUMBER 51